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**Agenzia per la Protezione dell'Ambiente e per I  
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**THESIS**

**The role of the Economic Instruments  
for creating incentives to the better  
integration of the environment in other  
economic sectors**

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## ABSTRACT

L'oggetto del presente lavoro è l'impiego degli strumenti economici per la gestione ambientale, strumenti di cooperazione internazionale con i paesi della riva sud ed est del Mediterraneo.

Nella prima parte si vuole evidenziare il ruolo degli strumenti economici (tasse, obblighi, assistenze finanziarie, permessi negoziabili) e le relative modalità sulla base dell'esperienza dei paesi della Comunità Europea. L'uso di tali strumenti ha ottenuto negli ultimi anni un'importanza crescente ed è stato pienamente legittimato nella Dichiarazione di Rio delle Nazioni Unite sull'ambiente e sviluppo del 1992, il cui principio, "polluter pays", rappresenta il principio base delle politiche ambientali europee.

L'applicazione di tali strumenti offre la possibilità di preparare e realizzare progetti tesi alla creazione di un ambiente più sano, alla gestione sostenibile delle risorse naturali e di conseguenza al miglioramento della qualità della vita delle popolazioni.

Tuttavia in paesi come quelli della riva sud ed est del Mediterraneo, i governi sono spinti ad allocare le loro risorse in favore di problemi più urgenti, quali analfabetismo e povertà di massa. In questo scenario la presenza di progetti di cooperazione allo sviluppo finanziati da donatori esterni, di investimenti privati, e di un ambiente favorevole all'innovazione delle politiche di gestione ambientale, risulta necessaria.

Nella seconda parte sono stati individuati alcuni progetti realizzati nei paesi della riva sud ed est del Mediterraneo e finanziati con l'aiuto prevalentemente di organizzazioni internazionali.

Essi sono finalizzati al perseguimento di obiettivi importanti soprattutto in termini di miglioramento della disponibilità e della qualità di un bene prezioso, come l'acqua.

L'introduzione di una politica di *water pricing* è stata riconosciuta come uno strumento chiave per il raggiungimento di tale scopo. *Water charges*, infatti, possono aiutare a generare i fondi necessari sia per il miglioramento delle infrastrutture e per la loro manutenzione sia a procurare incentivi per un più efficiente uso dell'acqua.

Infine, l'ultima parte è dedicata al corpo legislativo europeo che regola il comportamento del cittadino in materia ambientale. Vengono riportate le più importanti direttive e regolamenti comunitari relativi non soltanto alle aree tematiche prioritarie dello SMAP (acqua, rifiuti, hot spot, zone costiere, desertificazione) ma anche a quegli strumenti di informazione e di gestione ambientale, necessari per l'introduzione nonché l'applicazione di tali regole.

## **Abstract**

The object of the thesis is the application of economic instruments as environmental management measures in the framework of international cooperation actions with southern and eastern Mediterranean countries.

In the first part it's put in evidence the role of the various economic instruments (in term of taxes, duties, financial assistance, negotiable permits) and their possible use badly required on the basis of the European countries' experience.

The use of this kind of tools has gained increasing importance and was fully legitimised in the United Nation's Rio Declaration on the Environment and Development in 1992, whose principle "polluters pays" is an underlying principle of all European environmental policies.

The application of these instruments offers a possibility for designing and implementing cooperation projects aimed at the reduction of the overall

pollution of the environment, as well as at the better management of natural resources, and so at the improvement of the population's quality of life.

Unfortunately, developing countries are often under pressure to spend their resources on services needed by the poor and demanding citizenry. They are more induced to allocate their limited resources to basic matters like eradication of mass illiteracy and reduction of mass poverty. In these cases international cooperation has an important role to play. While domestic rather than external resources should be the dominant source of financing environmental actions, external finance can make an important financial contribution in these countries, and it can play an important catalytic and demonstration role.

In the second part, the work introduces some projects already implemented in the southern and eastern Mediterranean countries and funded with the help of international organizations.

They were mostly aimed at pursuing important objectives, especially in term of better availability of the water for the customers and quality amelioration of such precious good.

At this regard, water pricing policy is being increasingly recognized as a key instrument for improved water allocation, better conservation and quality preservation. Water charges, in fact, are believed to help to generate the necessary funds for infrastructure development and maintenance, and provide incentives for efficient water use.

The last part of the thesis is dedicated to the most important environmental laws, directives and regulations that regulate the European citizen's behaviour.

They are related not only to the SMAP priority areas (water, waste, hot spot, integrated coastal zones, desertification) but also to those information and management tools, needed for a better introduction and application of the new regulations.

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## INTRODUCTION

The cooperation between European Union and the Mediterranean region developed within the framework of the so-called Euro Mediterranean Partnership, which was initiated at the 1995 Barcelona Conference of EU and Mediterranean Foreign Ministers. It covers co-operation with individual countries and co-operation at a regional level, covering political, economic and cultural fields.

Within the framework of the Euro-Mediterranean partnership, the Short and Medium-Term Priority Environmental Action Programme (SMAP) was adopted at the 1997 Helsinki Conference. While SMAP focuses on priority areas (integrated water management, waste management, hot spots, integrated coastal zone management and combating desertification), the signatories noted the importance of promoting *the transfer of Community experience in the field of financing techniques, legislation and environmental monitoring and integration of environmental concerns in all policies.*

In line with these considerations, supportive measures to the SMAP Programme include the *promotion of adoption and implementation of legislation and regulatory measures when required, in particular of preventive measures and of appropriate environmental standards, in order to up-grade the environment in the region and to contribute to the economic development and to the establishment of an environmentally sustainable Free Trade area.* These provisions clearly demonstrate the interest of both the EU and the MED countries in considering convergence with European environmental legislation.

At this regard, the introduction of some form of taxation is going to be very important. This kind of tool, included in that group of economic instrument adopted by most European countries, is considered to be able to achieve the needed results.

Properly used, economic instruments can claim important advantages:

- They can produce incremental improvements in environmental quality over and above those attainable through direct regulation.
- Some economic instruments provide a revenue source for self-financing pollution control programs.
- The total social cost of meeting a given target is reduced; the total cost burden on polluters is also reduced.
- Economic instruments preserve incentives for technical progress, with respect to both abatement and prevention technology.



# **I**

## **Economic Instruments and the Environment**

### **1.1 The role of economic instruments**

Economic instruments (EIs) perform the role in the implementation of the environment development. Namely, the EIs are tools to create incentives for a better integration of the environment in other economic sectors.

Most of the countries apply the same EIs. The EIs aim at bridging of the gap, which, from time to time, may exist in various economics among the private cost/risks and the public cost/risks. They provide the investors/entrepreneurs with some “external economies” very badly required by them in order to equate their cost/risks with the social ones in these countries. In this manner, the EIs motivate private investors to serve the society by serving themselves.

The EIs are badly needed everywhere regardless of the economic order however the politics and the applicability of those differ and diverge in a very significant way from one country to another. Obviously the centrally led economies, like the ones of most MEDA countries, need to carry out major institutional changes to better welcome private initiatives, and to create a different approach to anything involving environment.

## **1.2 The role of the Economic Instrument to motivate the initiation of projects aiming at the creation of a sound environment**

The average citizen in the societies, which rely upon the private initiative as a basis for the economic growth, does not pay much attention to any project not yielding an adequate return on the capital invested. It should be adequate enough to cover the risk premium in his respective country discounted at his rate of discount. Given the relatively high investment risk for private investors prevalent in the countries like MEDA' s, the discount rate used by the entrepreneurs-investors to assess the project returns is very high in comparison with that prevalent in the countries like the USA or Germany. The investors are usually quite interested in short-term high-yielding projects much more than in long-term and low-yielding projects.

The main consequence of this behaviour is that they have been shown themselves quite apathetic and reluctant to implement environmental projects of any significance. The remedy to this bias is either to leave these projects totally to be implemented by the state in an investment programme, or to provide the investors with adequate incentives via a number of innovative and creative EIs, which could fill the deterring gap between the private benefits (costs) and the social benefits (costs).

Unfortunately, the development countries are always under pressure to spend their resources on services needed by the poor and demanding citizenry. They feel themselves always induced to allocate their limited resources to basic matters of the top and urgent priority like eradication of mass illiteracy and reduction of mass poverty.

The environmental projects remain comparatively low on the governmental investment agenda, simply because what remains for the

environmental projects of the scanty resources is seldom enough to cover the initial and running costs of such projects. Therefore, there are no many alternatives besides to rely upon the private sector to do this job. Here we come back to the EIs. Of course, the government can use a multiple of EIs in order to induce the private sector of a state to perform this function. That requires *prima facie* the amelioration of the investment climate in general and the allocation of a high priority to the investment in such projects. In technical terms, this denotes that the external economies provided to these projects have to be extensive and generous. That action must be preceded by an overall campaign aiming at raising the social awareness of the environmental problems and their long-term impact on the health of the people in a very poor society. Given this kind of consciousness the producers and the consumers should be more inclined to share evenly the costs of the operations aiming at the reduction of the overall pollution of the environment in the state.

Both should contribute to the amelioration of the environment and the improvement of the quality of life. Subsequently, both consumers and producers should be induced and taught to co-operate and bear out the costs as they enjoy the benefits together. Their operation is of mutual benefit for both consumers and producers, as well as for the whole society.

### **1.3 Systems for financing infrastructure and water services**

The use of economic instruments (taxes, duties, financial assistance, negotiable permits) has gained increasing importance and was fully legitimised in the United Nations' [Rio Declaration](#) on the Environment and Development in 1992. The central environmental role to be played by economic instruments is also recognised at Community level. The

Treaty considers that, in particular, the "polluter pays" principle is an underlying principle of European environmental policies. Furthermore the [framework directive on water](#) advocates a boosting of the part played by pricing in order to improve the sustainability of water resources.

Public spending on water often needs to increase, especially in the poorest countries where consumers are unable to afford the full costs of water services. Public spending will not only need to come from local governments, but also from regional and central government sources, since local governments usually lack the means to shoulder the financial burden alone.

International cooperation has an important role to play. While in most cases domestic rather than external resources will be the dominant source of finance, external finance can make an important financial contribution in the poorest countries, and it can play an important catalytic and demonstration role in others. External finance can support financial and governance reforms in the sector, build capacities, and introduce international disciplines and good practices.

Concerning domestic public expenditure, reliable and sustainable financing are needed to expand and maintain adequate water supply and sanitation services for all. Lessons can be drawn from the experiences of OECD and transition economies in developing systems for financing infrastructure and water services provision and in applying full cost recovery water pricing systems.

Full cost recovery water charges can help to generate the necessary funds for infrastructure development, renewal and maintenance, and provide incentives for efficient water use. Most OECD countries have been moving towards water pricing schedules that reflect the full marginal costs of providing water services for households and industry, combined with measures that better target support to low-income users who most

need it. Service fees for municipally supplied water services are in place in almost all OECD countries. In about one-third of countries, they now cover the full cost of operating and maintaining water facilities and may include all or part of capital costs. Agricultural water use, however, remains heavily subsidised in OECD countries.

The structure of water pricing tariffs varies considerably amongst OECD countries, but there is a trend away from fixed charges and toward tariffs which reflect the amount of water actually consumed. Partly as a result of these pricing systems, per capita water use has fallen in OECD countries by about 11% since 1980, and almost half of OECD countries have reduced their total water use.

Most OECD countries have adopted measures to ensure affordable access by all segments of society to water supply and sanitation services. Such measures include tariff-based mechanisms (*e.g.* where the charge increases with each additional unit of water used) or income measures (*e.g.* through direct subsidies to low-income consumers or those with large water requirements, such as for dialysis purposes).

Other measures include reducing VAT or waste water taxes, use of progressive social tariffs, avoiding water disconnection, and abolishing annual fixed fees.

Water charges applied to industrial water use and wastewater treatment in OECD countries have also been approaching full cost recovery levels. Most of the water used by industry now comes from direct abstraction in OECD countries, for which about half of all OECD countries levy charges. Pollution charges for discharging effluent to natural waters now exist in more than a dozen OECD countries. These charges are often quite high, and as a result many water-intensive industries have moved towards in-house water recycling or water treatment.

#### **1.4 Water assessment in MEDA countries. Social, environmental and economic aspects.**

A forum on the economic valuation of water was held in Beirut in June 2002. There were 162 representatives from ministries involved in agriculture, drinking water and wastewater, from eight countries in the Middle East and North Africa.

The principal case studies were from Tunisia, Morocco and Jordan, with additional papers presented from a number of countries (e.g. Lebanon (see Geadah, 2002), Egypt and Yemen). Ten case studies were prepared covering aspects of valuation in drinking water, agriculture and wastewater.

The objective of the forum was to encourage decision-makers to recognise the importance of water valuation as a tool in managing water demand. The forum showed the extent to which the valuation experience across the region is varied, and promoted the exchange of experience in all three sectors: agriculture, drinking water and wastewater.

Given the scarcity of water in MENA, water valuation is an economic tool that can contribute significantly to managing water demand, and may bridge the gap between supply and demand.

The forum highlighted that the concept of "*value* of water" is more complex than financial and/or economic valuation to include several other dimensions, such as the social, cultural, historical and environmental.

Water services include production, distribution, irrigation and the collection, treatment and distribution of treated wastewater. It was also recognised that in spite of people's reservations, steps to recover the investment and operating costs of facilities for providing users with the water they need is valid. It may be noted that the more abundant water is, and the closer it is to places of utilization and the better its quality, the lower will be the investment and operating costs for making it available to users; yet this does not rule out taking the opportunity cost of water

into account. Without seeking to diminish the value of this debate, the forum chose to focus more on the examination of water prices or tariffs (the terms that will be used in this paper) and their role in demand management.

Water pricing is often conceived as an instrument of cost recovery in water utilities and irrigation schemes. Weak cost recovery translates into inadequate financial resources to maintain minimum operation and maintenance, not to mention expanding or upgrading the system to accommodate additional users. The quality of services then declines and users resist any price increase, thereby further undermining the financial means for O&M and causing services to deteriorate further. This vicious circle can only be broken by substantial investments in upgrading facilities, reducing leakages and improving services. In an era of structural adjustment programmes and heavy internal and external pressures to cut public expenditures, raising water tariffs provides governments with an option for additional revenues, but it is something that users find hard to accept.

The case studies provide many illustrations of this situation for agriculture, drinking and wastewater services. In Morocco and Tunisia, agricultural water prices were frozen for a long time, which meant there was a significant pricing lag that had to be made up to support system rehabilitation programs (El Yacoubi and Belghiti, 2002; Hamdane, 2002). In Jordan, drinking water prices were far below real costs of O&M and, as a result, the distribution networks were not properly maintained (Taha and Bataineh, 2002). Thus, water was being lost through increasing leakages in a country where it is particularly scarce and households suffer severely from shortages.

In the absence of additional financial resources (from the government budget or from external loans), water utilities would need to substantially increase water tariffs in order to generate the needed revenues to prevent

further deterioration in the provision of water services. Additional increases in water tariffs would also be needed to adjust for periodic increases in O&M costs and for inflation in general. In Morocco, the prices for irrigation as well as for drinking water and sanitation services delivered under concession contracts are indexed to inflation rates.

There are also **social aspects** involved. When there is no funding to expand water and sanitation systems, the first to suffer are the poor who live on the outskirts of the cities and in the countryside. Because these communities are often unconnected to the water system, they find themselves obliged to pay high unit prices for trucked water (which can cost up to 50 times the price of tap water), and to make do with lower and insufficient quantities of uncertain quality, or to see their women and children spend their time carrying water, instead of going to school or engaging in more profitable activities. According to some, social concerns should focus on facilitating connections for these disadvantaged groups to the drinking water and sanitation systems, i.e. giving them access to services, rather than in keeping prices artificially low for all consumers (Saghir, 2002). In Morocco, families not connected to the water network pay 7% of their household budget on water, while those that are connected pay only 0.7% (Lahlou and Bahaj, 2002).

In order to improve both rural water services and its system management efficiency, Morocco and Tunisia have introduced programs that are gradually transferring responsibility to the users of water services, so that they contribute to the investment effort and take over operation of the systems for distribution of drinking water and agricultural water. This approach should lead gradually to full cost recovery from users and would involve the beneficiaries directly.

Mostly relevant to wastewater services, tariffs generate investments for collection and treatment before discharging it into the environment or reusing it. Thus, tariffs also have an **environmental role**, often expressed



in the "polluter pays" principle. For Jordan, Morocco and Tunisia, the sanitation charge is generally calculated based on the quantity of drinking water consumed. In Morocco, however, this charge has been replaced by a "council tax" for sanitation when the service is managed directly by the commune (Lahlou and Chigguer, 2002).

With regard to **economic aspects**, tariffs should send a clear and simple signal to consumers to encourage them to rationalize their demand for water. A low price gives the impression that there is an inexhaustible availability of water and saps the economic justification from efforts to curb consumption. This leads to misallocation and misuse of the resource. At the same time, a price that is too high departs from the Pareto optimum because it unduly limits consumption of an available resource, reduces user satisfaction and penalizes the poor segments of society. To induce efficiency, the signal must be fair. This means that the tariff applied must reflect actual consumption, measured in a reliable way. Tariffs should also vary according to water quality. In Morocco, prices for agricultural water are reduced as a function of salinity (El Yacoubi and Belghiti, 2002). In Tunisia, a significant price cut (up to 74%) was introduced to encourage the reuse of treated wastewater (Aniba, 2002), and sanitation charges to industries vary according to the degree of pollution of industrial effluents. This pricing structure provides industry with a financial incentive to invest in pre-treatment of effluents.

In addition it needs to spend a few words about the importance of the **metering system**. A reliable metering system not only brings transparency into the relationship between the service provider and the user, but also provides information on the level of consumption, as a basis both for achieving savings and for planning future needs. Consumption metering is widely used to ensure that these tariffs are fairly applied. According to the case studies, drinking water bills are based on the quantity consumed, as indicated by meters, and wastewater services are also billed on the basis of drinking water consumption.

### **1.5 Impact of pricing on drinking water saving**

The long-standing efforts in Tunisia and Morocco have achieved satisfactory levels of service for drinking water. About 85% of urban dwellers are connected to water systems in both countries; in Jordan 95% of households are connected but service is only intermittent. Tunisia and Morocco have also achieved some reductions in unaccounted for water (averaging 32% in Morocco, and around 20% in Tunisia in 2001) as well as assuring continuous service. Because Jordan faces an acute water shortage and much of the water that enters the system is being lost, facilities are being upgraded to prevent leakages.

Bills for drinking water are having relatively little impact on consumers in Morocco and Tunisia: they account for less than 1% of household budgets and business turnover. In Amman, Jordan, the water item in household budgets rises from about 1% in winter to 2.9% in summer, while in rural areas the corresponding figures are 0.7 and 1.4%. Yet the intermittent nature of service leads many customers to rely on pumping and reservoirs: when these factors are taken into account, the water share of household budgets rise to between 2.3 and 4.6% in Amman and 1.5 to 2.3% in the countryside.

The drinking water agencies in Morocco and Tunisia are financially independent. They no longer receive subsidies, and are now developing the capacity to finance themselves (investments are being self-financed to the order of 40%), in addition to which they can borrow to finance system extensions and renovations. It must be noted, however, that government pays for the construction and upkeep of dams.

The Tunisia and Morocco case studies show that customers have shifted from the higher to the lower consumption blocks. The Tunisian study estimated that industrial consumption over the same period declined by

3%, while consumption in the tourism sector recorded a drop of 0.7%. These savings not only conserve water but also allow investments to be deferred, and in this way they improve the allocation of funds in financial terms. The Jordan case study also reports a decline in domestic consumption (of 3%) following a major price hike in 1997, but the intermittent nature of service makes it difficult to assess real demand.

## **1.6 Irrigation water pricing policy and experiences in MEDA countries**

Water pricing policy is being increasingly recognized as a key instrument for improved water allocation, better conservation and quality preservation. It induces better demand management of water resources and is seen by many as the ultimate solution in water-deficit areas where supply is limited or cannot be augmented.

The various uses of water differ in many ways and it would be too simplistic to generalize to all types of use the impact of water pricing on demand and conservation. The agricultural sector differs from the other sectors by a heavier demand for water, different water resources, different supply and management systems, the potential profit made by users and the nature of water users, to cite just a few. Social and religious dimensions and political considerations further complicate the situation of irrigation water pricing. Therefore, in many countries, particularly developing ones water pricing and cost recovery is still in very slow pace.

Several factors constrain the implementation of water pricing. The physical and hydraulic characteristics of the water distribution system often constitute a major limitation. The source of water used has also impacts on water pricing policy reform, such as groundwater versus

surface water. Water management continues to be a centralized process in most countries and revealed to provide a low level of service. Lack of resources to the public agencies to maintain the water distribution systems contributes to reducing the level of service. Countries are now moving towards more de-centralization of the process, through transfer of management responsibilities to non-governmental or private sector entities. Political pressure on governments, to continue maintaining a certain level of subsidy to water management, slows down the process of water pricing. The social dimension is yet another factor that comes into play as farmers have their own perceptions of water that are derived from cultural, traditional and religious beliefs.

Several RNE countries with ample renewable water resources made important efforts since the 1960s and 70s to develop their irrigation sector. The objective of this orientation was to promote intensive agriculture with a high economic value, capable of satisfying part or all of the national food needs and achieving an exportable surplus, while stabilizing production through mitigation of the negative effects of drought that make rainfed agriculture fragile and non reliable. In order to encourage adoption of this policy by farmers, states supported the initial investments and the operational costs of the hydraulic and irrigation schemes installed, but soon this became a heavy financial burden.

With transition of the economy towards liberalization and a progressive shift to open market mechanisms, it is now more and more recognized that governmental subsidy at least to the operational and maintenance costs cannot continue while ensuring the level of services required. *Huge budget deficits, rising cost of maintenance and over extended institutions are widening the gap of resources needed and the current level of expenditures. As a result about \$12.5 billion of yearly investment in water resources go unrecovered in the region (FAO 1993).* With varying levels between countries, governments are shifting their policy to

demand management as the key instrument for improving water utilization in agriculture.

This policy is based on three axes. More participation and involvement of water users in water resources management, the promotion of modern irrigation technology and management tools and the adoption of water pricing regime to recover the operation and maintenance cost, but also future investments.

A few countries introduced timid water tariffs since the 1960s and 70s or even earlier, but it wasn't until recently that the policy of irrigation water pricing is making its way. In some countries, even the idea has not matured enough, whereas in the countries where the policy has been adopted, slow strides are being taken in the field of cost recovery. Pilot areas and small-scale programs are just being implemented to test the policy, but in general the experience is encouraging to the countries that took the lead as well as to the other ones.

In **Algeria**, water tariff is recognized to be an important instrument to conserve water and to improve water use efficiency. The tariff system, which aims at recovering the operation and maintenance expenses, is single tariff to cover O&M costs. There is, in addition to O&M tariff, a tax applied on maximal discharge which varies according to the irrigation specifics.

The fixed rate per hectare ranges from \$3.97 to \$7.59 per year or per season. The variable rate ranges from \$0.019 to \$0.022 per cubic meter (Dinar, 2001).

**Morocco** introduced the policy of water pricing in its 1969 Agriculture Investment Code that regulated investment and management of irrigation in the country. It was decided at the time that farmers would participate with a maximum of 40% of the total costs excluding the part attributable to the production of energy from hydraulic structures.

Morocco started also an ambitious program to treat sewage wastewater to protect the environment and to relieve the pressure on fresh water. The treated wastewater is considered as a water resource and sold to farmers.

**Tunisia** adopted water pricing in the irrigated schemes since the late 60s and early 70, but the tariffs were low (4 to 6 millimes<sup>4</sup>/m<sup>3</sup>), which did not allow the public agencies managing these schemes to equilibrate their O&M budgets. The deficits limited the capacity of these agencies to adequately maintain the installed hydraulic and irrigation networks systems, and all costly and successive rehabilitation works had to be supported by the public sector.

Starting in 1990, a new water pricing policy was developed. It consists of encouraging the creation of Collective Interest Groupings (groupements d'intérêt collectif - GIC), to take over public agencies for the management of irrigation schemes, and increasing water prices at an annual rate of 15% in nominal terms (9% in actual terms). The policy aims in a first phase at the integral coverage of operation and maintenance costs. Table 1 shows the evolution of tariffs and recovery rate (RR) between 1991 and 2000.

**Table 1.**  
**Evolution of operation and maintenance cost and of water tariffs by region**

Region	Year					
	1991			2000		
	Tariff(*) (Millime/m <sup>3</sup> )	Cost (Millime/m <sup>3</sup> )	RR (%)	Tariff (Millime/m <sup>3</sup> )	Cost (Millime/m <sup>3</sup> )	RR (%)
North	45	59	76	101 (US\$ 0.07)	85	119
Sahel	49	87	56	116 (US\$ 0.08)	143	81
Centre	36	81	44	68 (US\$ 0.05)	63	107
South	21	35	60	35 (US\$ 0.025)	42	83
Total	43	61	70	94 (US\$0.066)	82	115

The new policy has been implemented in some Governorates, but in others where low-income small farms dominate, farmers have been reluctant. As a result of this new policy, water prices have more than doubled in all the country. The rate of increase is higher than that of most other entrants. During the same period, the price of fertilizers was increased by only 44% (potassium sulfate and ammonium Nitrate) to 53% (super-phosphate), despite the dismantling of subsidies for these products. Similarly, the price of labor and mechanized works increased by 58% and 60%, respectively.

Irrigation water in **Jordan** is subsidized by the government, but in a proportion relatively less than in most other countries.

Attempts to raise tariffs to recover full operation and maintenance costs as well as part of the capital investment are met with pre-requisites from farmers to secure the export market for agricultural products. In addition, they request the lifting of agreements to allow imports during the local production season and to stop pumping water to Amman for domestic use as a priority allocation. Farmers believe that their traditional rights to get free water from springs have been violated when the Government started charging them the operation and maintenance costs.

The relatively high water tariff paid by farmers is not reflected in the quality services provided for operation and maintenance, which indicates that the recovered funds are not reinvested for such services.

In **Syria**, the policy of water pricing to control demand management is recent. Charges are only applied for water diverted from governmental irrigation networks. Farmers who benefit from public irrigation systems pay a fee intended to recover part of the investments, taking into consideration irrigation development cost for an amortization period of 30 years with no interest.

In **Egypt**, no water pricing has been adopted up to date. The growing increase in water demand is leading officials to adopt policies to improve water allocation and productivity.

Irrigation management transfer, irrigation improvement and matching irrigation supply and demand are three major policy reforms to help in improving water allocation.

In short, the current water prices in the Near East Region are still low, with relative differences between countries. The average share of water costs is way below 10% when considering all countries on which data is available. In countries where the prices are still very low such as Syria, even doubling the current prices, which would be very sensitive from the political standpoint, would keep the share of water costs below 5 to 10%. Adopting a water pricing policy requires establishment of a relevant institutional framework. One of the important institutional reforms is decentralization of water management. This infers handing over water management responsibilities and decision-making to the local entities, either governmental or non-governmental, to improve the water allocation process through clearing out the redundancies in the management process. Organization of water users and their participation in the process of water management is also essential so that they feel the ownership of water allocation networks. The participatory approach in water management is currently undertaken by most of developed and



developing countries through establishing of water users associations (WUAs) and transferring water management to these entities.

Legislation to define and preserve water rights and to protect water resources from degradation is an integral part of the process. Introducing water pricing involves reforming the existing regulations to cope with the pricing policy and other water management innovations. Judicial systems are needed to regulate the collection of water tariffs, to resolve disputes emerging from water allocation and to provide suitable services. The legislation and regulatory systems should also consider the different water resources, such as surface water, groundwater and low quality water. For each type of resource, a set of regulations would be needed to manage and operate it.

Technical modifications are often needed for implementing water pricing. This includes improved water conveyance and distribution systems that are able to deliver the right amount of water at the right time. Installing water meters on the distribution system permits a better water tariff system based on the actual volume of water delivered to farmers. Through water meters, a progressive tariff system could also be implemented that provides more control on water delivery.

A range of economic and non-economic tools is available to implement a cost recovery program that can meet the financial and economic requirements. Water prices that cover O&M should be sought. This level of tariffs, applied where the conditions are favorable, would be bearable and acceptable to farmers. The policy should be introduced in a progressive manner, accompanied by a system of incentives aimed at the adoption by farmers of water saving technology, to reduce the amounts applied and the costs associated with water, and to improve the services provided to farmers, particularly operation and maintenance.

## **1.7 Objectives of the EI**

In this Section, there are been individuated the most important objectives of the EIs including the reference indicators to reach their achievement.

**Table 2. Ecocharge: Charge paid for a specific environmental service provided to the charge payer**

Hierarchy of Objectives	Key Performance Indicators
<b>Development Objective:</b> Development of the region by means of tourism activities	Real incomes of local residents. Number of visitors before and after the implementation of EI
<b>Environmental Objective:</b> Prevent unsustainable exploitation of coastal or marine resources	To comply with related EU Directives (such as 91/271/EC Urban WW Directive and/or EU Bathing Water Directive)
<b>Financial Objective:</b> To cover the full cost of wastewater and infrastructure utilities. Each subscriber paying according to the wastewater they generate (PPP)	Revenues collected per wastewater generated before and after EI. Total revenues and costs before and after EI
<b>Equity Objective:</b> Exemption of ecocharge for the people who are less well off	Real incomes of local residents

Table 3. User Charge for Domestic Wastewater

Hierarchy of Objectives	Key Performance Indicators
<b>Development Objective:</b> Improvement of living standards of livelihoods in the context of sustainable development	Real incomes of local residents (baseline group will be established)
<b>Environmental Objective:</b> Continuous improvement in water quality and wastewater services of municipality	Number of households received the appropriate wastewater collection, treatment and disposal services
<b>Financial Objective:</b> To cover the full costs of collection of wastewater; planning, construction and operation of WWTP and canal systems	Revenues collected per wastewater generated before and after EI. Total revenues and costs before and after EI
<b>Equity Objective:</b> Establishment of equity in such a way that all users pay the charge or tax per wastewater generated	Quality and quantity of the wastewater generated before and after EI for baseline group to be selected

Table 4. Ecocharge: Charge paid for a specific environmental service provided to the charge payer

Hierarchy of Objectives	Key Performance Indicators
<b>Development Objective:</b> Development of the region by means of tourism activities	Real incomes of local residents. Number of visitors before and after the implementation of EI
<b>Environmental Objective:</b> Prevent unsustainable exploitation of coastal or marine resources	To comply with related EU Directives (such as 91/271/EC Urban WW Directive and/or EU Bathing Water Directive)
<b>Financial Objective:</b> To cover the full cost of wastewater and infrastructure utilities. Each subscriber paying according to the wastewater they generate (PPP)	Revenues collected per wastewater generated before and after EI. Total revenues and costs before and after EI
<b>Equity Objective:</b> Exemption of ecocharge for the people who are less well off	Real incomes of local residents

**Table 5. Tax for Urban Runoff: Storm water from city streets and adjacent domestic or commercial properties that contains litter, and organic and bacterial wastes**

Hierarchy of Objectives	Key Performance Indicators
Development Objective: Sustaining and improving of living standards in urban areas	Real incomes of local residents. Level of economical damage and pollution due to floods before and after the EI
Environmental Objective: To prevent the deterioration of the water quality, soil erosion and landslides after the flood	Level of deterioration due to erosion and change in water quality
Financial Objective: To cover the full costs of infrastructure to be built up for flood period	Total revenues and costs before and after EI
Equity Objective: Exemption of tax for the people who are less well off	Real incomes of local residents

**Table 6. User Charge for Industrial Wastewater**

Hierarchy of Objectives	Key Performance Indicators
Development Objective: Maintaining sustainable livelihoods for communities by means of sustainable usage of natural resources	Social and economical sustainability indexes
Environmental Objective: Improving of quality and quantity of natural resources	Level of deterioration of natural resources
Financial Objective: To cover the full costs of infrastructure to be built up	Total revenues and costs before and after EI
Equity Objective: All industries pay the charge according to the wastewater they generated and pollution they created proportionally	Wastewater flow rates and quantity and quality of pollutants

## II

### PROJECTS

#### **2.1 Ba' albeck water and wastewater project**

##### ***Introduction***

This project, funded by the World Bank, is aimed at pursuing important objectives about the water management in the Ba' albeck area.

Despite the availability of water resources in Lebanon, the water supply and wastewater sector is unable to provide satisfactory services to the majority of the population. Almost half of all water existing is unaccounted for because of losses and billing deficiencies, while leaking or overflowing wastewater collection systems cause severe sanitary conditions and contaminate surface and groundwater resources. The service deficiencies are caused both from neglect of infrastructure operation and maintenance, and from more fundamental structural problems in the sector.

##### ***Project objectives***

The major development objectives of the proposed project include:

- a) developing and strengthening the capacity of the Ba'albeck Hermel Water and Irrigation Authority (BHWIA) and the Zahle and Chamsine Water Authorities (ZWA and CWA);
- b) improving the access of the customers of the BHWIA to satisfactory water supply and wastewater services;
- c) involving the private sector in the operation and maintenance (O&M) of the water and wastewater facilities; and
- d) rationalizing the use of water through the introduction of water meters;



e) Introduction volumetric tariffs and sanitation tariffs.

*Specific activities for introduction of the tools*

The three main objectives that need to be taken into account when designing a tariff policy for water and sanitation are: efficiency, equity and cost recovery. Since water resources are scarce and their mobilization is costly, they need to be used efficiently. The levels of tariffs should, therefore, be such that users are encouraged not to waste these resources and to consume quantities that are commensurate with cost.

As mentioned above, the BHWIA has been applying a flat fee equal to US\$90 for the delivery of 1 cubic meter per day to each subscriber.

It is important to stress that the current system does not serve any of the objectives mentioned above. It works against efficiency since the water bill is independent of the quantity used. The problem would be worse with the new network since it allows subscribers to access supply on a continuous basis. It does not serve equity since households are charged the same bill regardless of their income and their ability to pay.

Finally, it does not allow to recover cost so as to ensure the sustainability of water supply, particularly if billing efficiency remains at its very current level (less than 35%).

Project area	Water Management
Focus(es) of the project	Legislation and regulatory measures; water conservation; Evaluation and monitoring of water quality and quantity; Waste water treatment systems; Capacity building; Networking, participation (private sector and civil society) and partnership building
Project Scale	National
Tools	Stream Master plans; Wastewater treatment plant; Introduction of customer water metering, volumetric tariffs and sanitation tariffs; Developing and strengthening the capacity of the Ba'albeck Hermel Water and Irrigation; Authority (BHWIA) and Authorities (ZWA and CWA) by introducing one regional authority to coordinate them; Extension of the wastewater collection and treatment network; Involving the private sector in the operation and maintenance (O&M) of the water and wastewater facilities;
Country(ies)	Lebanon

<b>Location</b>	Baalbeck, Zahle, Chamsine
<b>Budget</b>	U.S. 49,201 m dollars
<b>Timeframe</b>	01/01/2003 – 12/31/2007
<b>Implementing Organisation/s</b>	Council for Development and Reconstruction (CDR) / Ba'albeck Hermel water and Irrigation Authority (BHWIA)
<b>Contact</b>	Mr. Jamal A.R. Itani President of the CDR CDR / BHWIA P.O. Box 5351/116, Beirut- Lebanon Tel: 961-1-981396 Fax: 961-1-981252 E-mail: general@cdr.gov.lb.
<b>Donor/s</b>	International Bank for Reconstruction and Development 43.53 US \$ m
<b>Links</b>	<a href="http://web.worldbank.org/external/projects/main?pagePK=104231&amp;piPK=73230&amp;theSitePK=40941&amp;menuPK=22">http://web.worldbank.org/external/projects/main?pagePK=104231&amp;piPK=73230&amp;theSitePK=40941&amp;menuPK=22</a>
<b>Language</b>	English

## 2.2 Water & Sanitation Services in Gaza Project

### *Introduction*

In 1996 the World Bank provided a US\$25 million credit to the West Bank Gaza for the Palestinian Water Authority (PWA) in the Gaza Strip. The Water and Sanitation Services Project will address urgent priorities aimed at improving the quality, quantity and management of water and wastewater services in Gaza.

When the interim agreement between the Palestine Liberation Organization and the Government of Israel was signed in 1995, the water supply and sanitation (WSS) services in the Gaza Strip were in crisis. The water supply services were intermittent, the primary water resource was over extracted, and water quality was deteriorating due to the intrusion of deeper saline water, and contamination by seepage of pollutants from the surface.

Approximately 50 percent of water in municipal distribution networks was lost through leakages in distribution networks, illegal connections,

and inaccurate or no metering. Accordingly, the daily per capita consumption was estimated to be less than 70 liters a day, and the sewerage service coverage was only about 25%.

Consultations between the stakeholders resulted in a consensus that private sector involvement was the only way to rapidly improve water supply services. However, private operators were hard to attract due to the low water tariffs and high risk in investing in Gaza. At the same time, the Palestinian authorities had just been empowered to manage water resources, and would be loath to agree to divestment. Additionally, the lack of information on the existing system would leave little basis for establishing the terms or expectations of the concession contract or lease. A performance-based management contract for a limited duration was found to be the most appropriate course of action.

### *Objectives*

The project will assist the Executive Authority of the Palestinian Council in meeting urgent needs through: 1) improving water and sanitation services through a private sector management contract for water and wastewater operations; 2) strengthening and restructuring the institutional framework for both service delivery and sector governance functions; and 3) creating the operational, institutional and managerial conditions for priority rehabilitation, upgrading and extension projects to be financed by donors. The project will consist of the following components: 1) management contract fees; 2) operating investment; and 3) technical assistance and institutional capacity development.

The overall development objective includes reduction of poverty and achievement of economic growth through securing the water rights of the Palestinians and enforcement of equitable allocation of water resources among sectors and achieving environmental aims through the effective conservation and protection of these same scarce resources. In other words, PWA and the Project also have a fundamental role in contributing

to the reduction of poverty and in promoting water security and prosperity of the Palestinian people.

In mid 1996, Lyonnaise Des Eaux/ Khatib and Alami (LEKA) was awarded a four-year management contract to help local government service providers and the PWA improve water supply services. The management contract was designed to be highly flexible. LEKA and PWA were allowed to invoke a force majeure clause of the contract for any event beyond their control that made it impossible to fulfill their obligation. Such events included strikes, lockouts, as well as confiscation or any other action by government agencies. The management contract was performance-based, with a contract fee split between a fixed payment and additional payments based on the achievement of performance targets. These targets included the number of meters repaired or replaced, reduction in unaccounted for water, and the development of maintenance management systems. The total incentive payment for the four years was US\$3 million, which represented 50% of the fixed contract payment.

### ***Results***

Despite difficult circumstances, the project achieved its key development objectives of improving the WSS services in Gaza. By 2001, over 1,200 km of pipes were surveyed for leaks and over 16,000 illegal connections were identified, more than 20,000 meters were repaired and 30,000 meters replaced. The unaccounted for water dropped from around 50% in 1995 to 30% in 2001, and collections increased almost thirty fold in the course of two years. As a result, more water was provided to the people of Gaza. The per capita water consumption increased from 70 lcd in 1996 to 100 lcd by 2000. In addition, close to 100 percent of the water supply was chlorinated which reduced health risks. With the beginning of the 2<sup>nd</sup>

Intifada in September 2000, Palestinians were less able to pay for water. This adversely affected the financing of the WSS sector. Thus, some of the improvements that had been achieved were reversed.

<b>Project area</b>	Water Management
<b>Focus(es) of the project</b>	legislation and regulatory measures provision of safe drinking water capacity building networking, participation (private sector and civil society) and partnership building
<b>Project Scale</b>	local
<b>Tools</b>	Improving water and sanitation services through a private sector management contract for water and wastewater operations; <b>Management contract fees;</b> Strengthening and restructuring the institutional framework for both service delivery and sector governance functions; Technical assistance
<b>Country(ies)</b>	Palestinian territories
<b>Locations</b>	Gaza
<b>Budget</b>	28 US \$ m
<b>Timeframe</b>	07/02/1996 - 12/ 31/2002
<b>Implementing Organisation/s</b>	Palestinian Water Authority (PWA)
<b>Contact</b>	Mr. S. Mukherji, Sr Financial Analyst and Task team leader World Bank / MNSIF Group Room H9-119 1818 H Street, N.W. Washington , D.C. 20433 U.S. Tel.: 202/473-2439 Fax : 202/477-1998 E-mail: <a href="mailto:smukherji@worldbank.org">smukherji@worldbank.org</a>
<b>Donor/s</b>	World Bank Group grant 25 US \$
<b>Links</b>	<a href="http://web.worldbank.org/external/projects/main?pagePK=104231&amp;piPK=73230&amp;theSitePK=40941&amp;menuPK=228424&amp;Project">http://web.worldbank.org/external/projects/main?pagePK=104231&amp;piPK=73230&amp;theSitePK=40941&amp;menuPK=228424&amp;Project</a>
<b>Language</b>	English

## 2.3 Water Supply & Sewerage Rehabilitation Project

### *Introduction*



The Water Supply and Sewerage Rehabilitation project seeks to restructure the urban water supply sector by contracting out a number of its operations, such as leak detection and repair, optimization of meter reading and billing, and network recalibration and mapping, with private entrepreneurs. It advocates the creation of self-financing water utilities that would operate under concession agreements with the Government. To promote water conservation, the report recommends charging the true economic cost of the services to consumers. Until now, a national tariff structure has been applied for water services, with no provision for capital consumption and expansion. The project proposes changing this policy by levying regional tariffs that would cover both operating and maintenance costs, and the concession fees. The Government will use these fees to finance asset renewal and expansion. As large volumes of water produced are now unaccounted for, the project includes a network rehabilitation program aiming at reducing water losses. Most wastewater treatment plants in Algeria are currently inoperative. As a result, water pollution is spreading around the large urban agglomerations, damaging the natural environment. To mitigate these damages, the project proposes the rehabilitation of a number of existing wastewater treatment plants.

### *Objectives*

The project included the following components:

- 1) Water Supply Systems: a) Network rehabilitation in Oran and part of Algiers (about 15%) inclusive of leak detection and repairs, meter installation and gauging and b) water distribution network re-looping and balancing in the same two cities;
- 2) Sewerage Rehabilitation: feasibility studies for the rehabilitation of about 22 sewage treatment plants;
- 3) Consulting services to the Agence Nationale de Gestion de l'Eau Potable (AGEP) and the Agence Nationale des Barrages (ANB) to carry out the feasibility and detailed studies, and

environmental impact assessments of projected water and sewerage works;

4) Institutional Development to AGEF, ANB, Agence Nationale des Ressources Hydrauliques (ANRH) and the water utilities; and

5) Supply of operational equipment to AGEF, ANB, ANRH, and the water utilities.

#### ***Outcome/achievement of objective***

The achievement of the objectives is highly unsatisfactory. At Loan closing on December 31, 2003, project implementation had not progressed in any significant manner. The two major sub-projects (rehabilitation of water networks in Oran and in part of Algiers) remain substantially incomplete. The Government indicated that both sub-projects will continue to be executed using Government funding (the Algiers sub-project is scheduled to be completed by August 2004 and the one in Oran - with a sizable contract adjustment - around late-2006). However, even with the completion of the works, the ambitious target of 20% unaccounted-for-water (under both contracts) will most likely not be achieved. On the institutional side, the sector weaknesses remain as no improvement has been made in turning the utilities into self-financing entities, tariffs have stayed well below the cost recovery levels and unaccounted for water is yet to be improved. The situation in the other eight cities in the original design has not improved either. On the wastewater component, no tangible outcomes have been achieved since the loan stipulated that the rehabilitation of the sewage treatment plants would be carried out only when adequate institutional arrangements would be made to operate the system and operational costs would be covered by the operator. None of the improvements materialized.

Despite the unfinished works, some lessons have been learned and the Ministry of Water Resources has indicated its desire to use the project design in other cities where network rehabilitation and utility

management need immediate attention. Although it is clear that much more needs to be done in Oran and Algiers, the project has somewhat contributed to the upgrading of the capability of the local units in the two cities, including the skills of the local private contractors, to repair and manage the water networks. Some skills transfer has happened in mapping of physical infrastructure, in improved commercial systems, hydraulic modelling of networks and good construction practices.

<b>Project area</b>	Water Management
<b>Focus(es) of the project</b>	Legislation and regulatory measures; Provision of safe drinking water; Waste water treatment systems; Programme to tackle water losses; Administrative management of water resources; Capacity building; Networking, participation (private sector and civil society) and partnership building
<b>Project Scale</b>	National
<b>Tools</b>	Water supply system rehabilitation; Levying regional tariffs; Rehabilitation of existing wastewater treatment plants; Network recalibration and mapping with private entrepreneurs; Rehabilitation of sewage treatment plants; Institutional development to AGEF, ANB, Agence Nationale des Ressources Hydrauliques (ANRH); Environmental Impact Assessment (EIA)
<b>Country(ies)</b>	Algeria
<b>Locations</b>	Annaba, Ain Temouchent, Bejaia, Jijel, Mascara, Oran, Relizane, Sidi Bel Abbes, Setif and Tlemcen
<b>Budget</b>	170 US\$ m
<b>Timeframe</b>	06/02/1994 - 12/31/2003
<b>Implementing Organisation/s</b>	Agence Nationale de l'Eau Potable et Industrielle (AGEP) Ministry of Water Resources
<b>Contact</b>	Mr. A. E. Bakalian, Bank Team Leader Tel: 1 202 473 5319
<b>Donor/s</b>	IBRD 110 US\$ m
<b>Links</b>	<a href="http://web.worldbank.org/external/projects/main?pagePK=104231&amp;piPK=73230&amp;theSitePK=40941&amp;menuPK=228424&amp;Projecti">http://web.worldbank.org/external/projects/main?pagePK=104231&amp;piPK=73230&amp;theSitePK=40941&amp;menuPK=228424&amp;Projecti</a>
<b>Language</b>	English

## 2.4 Jordan Rift Valley Improvement Project



### ***Introduction***

The main objective of the JRVIP is to improve water management for irrigated agriculture and environmental protection as well as address issues of water quality in the Valley.

On the Jordanian side of the river, water scarcity and the pressure created by a rapidly growing population and rising incomes create a challenging situation for Jordan. The Ministry of Water Resources and Irrigation (MOWI) and the Government of Jordan are addressing this critical situation through a series of interventions, including augmentation of supplies from various sources, adoption of long term policies and strategies for management of water, and setting priorities for water use and water conservation. The last decade has witnessed many initiatives in the water sector, including improvements in water quality management, which could be considered important steps towards rational water management within Jordan.

### ***Objectives***

The Jordan Rift Valley Improvement Project is being developed by the Government of Jordan to address the need for 1) improved water management in the Valley, 2) improved financial sustainability of irrigation services in the Valley, 3) appropriate reuse of marginal quality waters and enhanced environmental protection, and 4) infrastructure development to promote tourism and other non-agricultural activities.

In particular, about the institutional improvements component, the project would include

- Revision of JVA mandate to focus on strategic and bulk water management and divestiture of retail irrigation services;
- Introduction of management accounting systems;
- Implementation of water tariff covering O&M costs;
- Introduction of maintenance contracts with private sector.

<b>Focus(es) of the project</b>	Water conservation; Programme to tackle water losses; Reduction of irrigation inputs; Collection, treatment, disposal and re-use of wastewater; Capacity building; Networking, participation (private and civil) and partnership building
<b>Project Scale</b>	National
<b>Tools</b>	KAC siphons; Pumping station; Micro-irrigations systems; Management accounting systems; <b>Implementation of water tariff;</b> JVA business plan; Wastewater Reuse Action Plan; Environmental Management Action Plan ; Training and licensing private dealers; Public awareness;  Introduction of maintenance contracts with private sector; Consolidation of drainage system and land reclamation; Promotion of land and water infrastructure;
<b>Country(ies)</b>	<b>Jordan</b>
<b>Locations</b>	Jordan Valley
<b>Budget</b>	60 US\$ m
<b>Timeframe</b>	N / a
<b>Implementing Organisation/s</b>	Ministry of Water and Irrigation- Jordan Valley Authority (JVA);  International Bank for Reconstruction and Development (IBRD)
<b>Contact</b>	Mr. Ashok Subramanian 1818 H Street NW Washington 20433 USA Tel: + 1.202.473.0359 E-mail: <a href="mailto:asubramanian@worldbank.org">asubramanian@worldbank.org</a> Or HE Eng. Zafer Alem Tel: 962-6-5689400 Fax: 962-6-5689916 Ministry of Water and Irrigation - Jordan Valley Authority (JVA) P. O. Box 2769 Amman- Jordan
<b>Donor/s</b>	IBRD +IDA 30 M US\$ Global Environment Facility 4-6 US\$ m Other Sources US\$ 22 million
<b>Links</b>	<a href="http://www.iwlearn.net/projects/profile.php?dcid=88">http://www.iwlearn.net/projects/profile.php?dcid=88</a> or <a href="http://www.wbcoastal.net/WBPdetailW.cfm?ProjID=149">http://www.wbcoastal.net/WBPdetailW.cfm?ProjID=149</a> or <a href="http://www-wds.worldbank.org/servlet/WDS_IBank_Servlet?pcont=details&amp;eid=000094946_01032007120330">http://www-wds.worldbank.org/servlet/WDS_IBank_Servlet?pcont=details&amp;eid=000094946_01032007120330</a> or <a href="http://web.worldbank.org/external/projects/main?pagePK=104231&amp;piPK=73230&amp;theSitePK=40941&amp;menuPK=228424&amp;Projectid=">http://web.worldbank.org/external/projects/main?pagePK=104231&amp;piPK=73230&amp;theSitePK=40941&amp;menuPK=228424&amp;Projectid=</a> or <a href="http://www.mop.gov.jo/reports_files/PIDOctober_1999.pdf">http://www.mop.gov.jo/reports_files/PIDOctober_1999.pdf</a> problemi server
<b>Language</b>	English

## **2.5 Urban water supply project**

### ***Introduction***

In November 2005 the World Bank approved a \$38 million loan to the National Public Water Supply Utility (SONEDE) -with the Guarantee of the Republic of Tunisia- for an urban water supply project.

The project aims at sustaining the reliability and quality of water service in Greater Tunis and selected urban centers, through augmentation, upgrade and renewal of the water supply infrastructure; and enhancing the competitiveness and sustainability of SONEDE operations, through modernization of management practices and information systems, for better cost control, enhanced revenue and more responsive customer service.

The project combines infrastructure and capacity building components:

- Infrastructure components represent priority needs towards avoiding service deficits as early as 2010 and meeting demands through 2025. The project will improve the water supply systems in SONEDE's Greater Tunis, North and Central operating regions.
- Capacity building components include the development of studies and decision-making tools, as well as the modernization of key information systems, to enable higher performance in utility management, planning, cost control and customer service.

### ***Objectives***

The proposed *Urban Water Supply Project* will support Government of Tunisia and SONEDE achieve the following development objectives:

- Strengthening of water supply and sewerage sector policy development and implementation processes to enhance sector performance, promote private sector participation and improve sound tariff and subsidy policies;
- Enhancing of SONEDE's performance through operating and financial management capacity building;
- Sustaining the reliability and quality of water service in Greater Tunis and other urban centers, through added production capacity, and transmission and distribution network upgrades.

<b>Project area</b>	Water management
<b>Focus(es) of the project</b>	Provision of safe drinking water; Programme to tackle water losses; Administrative management of water resources; Capacity building; Networking, participation (private sector and civil society) and partnership building;
<b>Project Scale</b>	National
<b>Tools</b>	Treatment plant construction; Water storage infrastructure construction; Pipelines rehabilitation; Water distribution systems upgrading; Financial simulation model; Developing tariff adjustment rationales; Setting performance and cost control goals; Telemetry, flow regulation, radio systems and leak detection equipment; Water supply Master Plans; Technical assistance; Public awareness programme;
<b>Country(ies)</b>	Tunisia
<b>Locations</b>	Greater Tunis and other selected villages (40 ca.)
<b>Budget</b>	47.15 US \$ m
<b>Timeframe</b>	01/2006 – 12/2011
<b>Implementing Organisation/s</b>	Societe Nationale d'Exploitation et de Distribution des Eaux (SONEDE) Ministry of Agriculture, Environment and Water Resources
<b>Contact</b>	Av. Slimane Ben Slimane Société Nationale d'Exploitation et de Distribution des Eaux (SONEDE) Manar II 2092 Tunis Tunisia Tel: (216) 71-887-000 Fax: (216) 71-871-000 E-mail: <a href="mailto:sonede@jsonede.com.tn">sonede@jsonede.com.tn</a>
<b>Donor/s</b>	Government of Tunisia 9.15 US \$m International Bank for Reconstruction and Development 38 US \$m
<b>Links</b>	<a href="http://www-wds.worldbank.org/servlet/WDS_IBank_Servlet?pcont=details&amp;eid=000104615_20040610121758">http://www-wds.worldbank.org/servlet/WDS_IBank_Servlet?pcont=details&amp;eid=000104615_20040610121758</a> - <a href="http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2005/11/01/000090341_20051101101219/Rendered/PDF/3339">http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2005/11/01/000090341_20051101101219/Rendered/PDF/3339</a>
<b>Language</b>	English

## **Conclusion**

From the present work we could certify that the EIs are badly needed everywhere regardless of the economic order; however the policies and the applicability of such tools differ and diverge in a very significant way from one country to another, and the results are going to be different too.

Whereas on the one hand some southern and eastern Mediterranean countries have taken some steps forward, especially as a consequence of the transition of the economy towards liberalization and a progressive shift to open market mechanism, on the other hand they are forced to face much more obstacles than the European countries, like the shortage of water, lack of suitable legislations, little availability by the central governments, lack of information and obviously the poverty.

In line with these considerations, they need to make a major effort through the adoption and implementation of legislation and regulatory measures when required, in particular of preventive measures and of appropriate environmental standards, in order to up-grade the environment in the region and to contribute to the economic development and to the establishment of an environmentally sustainable Free Trade Area.

With regard to the water pricing policy, considered a key instrument to achieve those objectives, the outcome is quite unsatisfactory at the moment.

The current water prices in the Near East Regions are still low, with relative differences between countries. The average share of water costs is way below 10% when considering all countries on which data is available. Adopting a water pricing policy requires establishment of a relevant institutional framework and surely a deeper information among the users about the advantages that the reforms can bring. In this way they will be more willing to pay bills and the governments inclined to accept the changes involved.

One of the important institutional reforms is decentralization of water management. This infers handing over water management responsibilities and decision-making to the local entities, either governmental or non-governmental, to improve the water allocation process through clearing out the redundancies in the management process.

A better legislation is an integral part of the process to define and preserve water rights and to protect water resources from degradation. Introducing water pricing involves reforming the existing regulations to cope with the pricing policy and other water management innovation. Judicial system are needed to regulate the collection of water tariffs, to resolve disputes emerging from water allocation and to provide suitable services.

Technical modifications are often needed for implementing water pricing. This includes improved water conveyance and distribution systems that are able to deliver the right amount of water at the right time. Installing water meters, a progressive tariff system could also be implemented that provides more control on water delivery.

Water prices that cover O&M should be sought. This level of tariffs, applied where the conditions are favourable, would be bearable and acceptable to users. The policy should be introduced in a progressive manner, accompanied by a system of incentives aimed at the adoption by users of water saving technology, to reduce the amounts applied and the costs associated with water, and to improve the services provided, particularly operation and maintenance.

## **Annex**

### **EUROPEAN LEGISLATION ABOUT ENVIRONMENT**

In this section I've collected the most important indications from the european legislation. I've choosed to do it by priority fields SMAP, including some of the supportive measures that are horizontal actions necessary to assist the non-EU Partners and to link with the long term:

1) priority fields SMAP:

- water
- waste
- hot spots (covering both polluted areas and threatened biodiversity elements)
- integrated coastal zone
- desertification

2) networking including with civil society

3) capacity building; awareness enhancement and exchange of experiences.

**1) Priority fields SMAP:**

**water**



- **Water Framework Directive**

The increasing demand by citizens and environmental organisations for cleaner rivers and lakes, groundwater and coastal beaches has been evident for considerable time. It has recently been reconfirmed by a representative opinion poll [Eurobarometer](#) in all 25 EU countries:

When asked to list the five main environmental issues that Europeans are worried about, averaged results for the EU25 show that nearly half of the respondents are worried about “water pollution” (47%), with figures for individual countries going up as far as 71%.

This demand by citizens is one of the main reasons why the Commission has made water protection one of the priorities of its work. The new European Water Policy will get polluted waters clean again, and ensure clean waters are kept clean. In achieving these objectives, the roles of citizens and citizens' groups will be crucial. This is why a new European Water Policy has to get citizens more involved.

European Water Policy has undergone a thorough restructuring process, and a new **Water Framework Directive** adopted in 2000 will be the operational tool, setting the objectives for water protection for the future. The Water Framework Directive (also known as the WFD or Directive 2000/60/EC) is a legislative framework to ensure sustainable water use throughout Europe by protecting and improving the quality of all water resources such as rivers, lakes, groundwater, transitional and coastal water within the European Union. The EU Water Framework Directive is the result of several years of consultations between the EU Member States on a common integrated water management policy. The Framework Directive approach is to:

- Protect all waters: rivers, lakes, coastal waters, and ground waters.

- Set ambitious objectives to ensure that all waters meet good status by 2015.
- Set up a system of management within river basins that recognises that water systems do not stop at political borders.
- Support Cross border co-operation between countries and all involved parties.
- Ensure active participation of all stakeholders, including NGOs and local communities, in water management activities.
- Ensure reduction and control of pollution from all sources like agriculture, industrial activity, and urban areas, etc.
- Establish water pricing policies and ensure that the polluter pays.

Much progress has been made in water protection in Europe, in individual Member States, but also in tackling significant problems at European level. But Europe 's waters are still in need of increased efforts to get them clean or to keep them clean. After 30 years of European water legislation, this demand is expressed, not only by the scientific community and other experts, but to an ever increasing extent by citizens and environmental organisations. We should take up the challenge of water protection, one of the great challenges for the European Union in the new millennium. These are the initiative generated by the political process on the Water Framework Directive for the benefit of all Europe 's citizens and waters:

- Getting Europe 's waters cleaner
- Getting the citizens involved.

- **Dangerous Substances to Water Directive**

The Directive [76/464/EEC](#) of 4 May 1976 *on pollution caused by certain dangerous substances discharged into the aquatic environment of the*

*Community* [\[scanned PDF file\]](#) was one of the first water related Directives to be adopted. It had the ambitious objective of regulating potential aquatic pollution by thousands of chemicals already produced in Europe at that time. The Directive covered discharges to *inland surface waters, territorial waters, inland coastal waters and ground water*. In 1980 the protection of groundwater was taken out of 76/464/EEC regulated under the separate Council Directive [80/68/EEC](#) *on the protection of groundwater against pollution caused by certain dangerous substances*.

- **Groundwater Directive**

The **Groundwater Directive** has been developed in response to the requirements of Article 17 of the Water Framework Directive.

The case of groundwater is somewhat different. The presumption in relation to groundwater should broadly be that it should not be polluted at all. For this reason, setting chemical quality standards may not be the best approach, as it gives the impression of an allowed level of pollution to which Member States can fill up. A very few such standards have been established at European level for particular issues (nitrates, pesticides and biocides), and these must always be adhered to. But for general protection, we have taken another approach. It is essentially a precautionary one. It comprises a prohibition on direct discharges to groundwater, and (to cover indirect discharges) a requirement to monitor groundwater bodies so as to detect changes in chemical composition, and to reverse any antropogenically induced upward pollution trend. Taken together, these should ensure the protection of groundwater from all contamination, according to the principle of minimum anthropogenic impact.



## Waste

- **Waste Framework Directive**

The two main EU directives which regulate waste management, the framework **Waste Directive** and the **Hazardous Waste Directive**, offer a good model as to how waste management should be regulated.

The Framework Waste Directive established a waste management hierarchy and requires Member States to adopt this hierarchy by encouraging , in order of priority:

- The prevention or reduction of waste production and its harmfulness; and
- The recovery of waste, including recycling, re-use or reclamation, or the use of waste as a source of energy.

As well as regulating the disposal and recovery of waste, the directive requires Member States to set up an integrated and adequate network of disposal installation, and to prepare and implement waste management plans.

- **Hazardous Waste Directive**

The Hazardous Waste Directive introduces a precise and uniform definition of hazardous waste, and promotes the environmentally sound management of hazardous waste, taking into account the special nature of such waste.

A number of controls, additional to those laid down in the Framework Waste Directive, are imposed in respect of the handling and disposal of hazardous waste. Such requirements would support a better control of industrial hazardous waste, which is usually not treated adequately.

## Hot spots

- **Air Framework Directive**

Air Quality is one of the areas in which Europe has been most active in recent years. The EC aim has been to develop an overall strategy through the setting of long-term air quality objectives. A series of Directives has been introduced to control levels of certain pollutants and to monitor their concentrations in the air. In 1996, the Environment Council adopted [Framework Directive 96/62/EC](#) on ambient air quality assessment and management. This Directive covers the revision of previously existing legislation and the introduction of new air quality standards for previously unregulated air pollutants, setting the timetable for the development of daughter directives on a range of pollutants. The list of atmospheric pollutants to be considered includes sulphur dioxide, nitrogen dioxide, particulate matter, lead and ozone – pollutants governed by already existing ambient air quality objectives- and benzene, carbon monoxide, poly-aromatic hydrocarbons, cadmium, arsenic, nickel and mercury.

**directive 2001/81/EC** of the European Parliament and of the Council on National Emission Ceilings for certain pollutants (NECs) sets upper limits for each Member State for the total emissions in 2010 of the four pollutants responsible for acidification, eutrophication and ground-level ozone pollution (SO<sub>2</sub>, NO<sub>x</sub>, VOCs and ammonia), but leaves it largely to the Member States to decide which measures to take in order to comply.

The emission ceilings are designed to meet interim objectives for acidification that have been agreed by Council and Parliament, plus new objectives for ozone, in the lowest cost way for the Communities as a whole.

The pollutants concerned are transported in large quantities across national boundaries. Individual Member States could not in general meet the objectives within their territory by national action alone.

**Clean Air for Europe(CAFE)** was launched in march 2001 with a Communication(COM(2001)245)). CAFE is a programme of technical analysis and policy development that underpinned the development of the Thematic Strategy on Air Pollution under the Sixth Environmental Action Programme. The Commission adopted the Thematic Strategy on 21 september 2005. The aim of CAFE was to develop a long-term, strategic and integrated policy advice to protect against significant negative effects of air pollution on human health and the environment.

As the result of EU legislation, much progress has been made in tackling air pollutants such as sulphur dioxide, lead, nitrogen oxides, carbon monoxide and benzene. However, despite a reduction in some harmful emissions, air quality continues to cause problems. Summer smog - originating in potentially harmful ground-level ozone - exceeded safe limits somewhere in Europe on two out of three days during summer 2001. Fine particulates also present a health risk which is of increasing concern. Clearly, more needs to be done at local, national, European and international level.

The EU's [Sixth Environment Action Programme \(EAP\)](#), '[Environment 2010: Our future, Our choice](#)', includes Environment and Health as one of the four main target areas requiring greater effort - and air pollution is one of the issues highlighted in this area. The Sixth EAP aims to achieve levels of air quality that do not result in unacceptable impacts on, and risks to, human health and the environment.



The EU is acting at many levels to reduce exposure to air pollution: through EC legislation, through work at international level to reduce cross-border pollution, through co-operation with sectors responsible for air pollution, through national, regional authorities and NGOs, and through research. The Commission has recently launched the Clean Air For Europe (CAFE), which will lead to a thematic strategy setting out the objectives and measures for the next phase of air quality policy.

- **Directive on Fuel Quality**

**Directive 98/70/EC** as amended by Directive 2003/17/EC contains the environmental fuel quality specifications for petrol and diesel fuels in the Community with the main focus on sulphur and for petrol on lead and aromatics. There are three distinct specifications. The first entered into effect on 1<sup>st</sup> January 2000, the second will enter into force on 1<sup>st</sup> January 2005 (it sets limits for the sulphur content of petrol and diesel (50 ppm) and the aromatics content of petrol (35% by volume) and the third (as amended by Directive 2003/17/EC), which will enter into force on 1st January 2005 as well, requires to phase in diesel and petrol with a sulfur content of 10 ppm. In addition, from 1 January 2002 all petrol sold in the Member States is unleaded.

- **Transport emissions**

In order to reduce car emissions, the European Union has developed, along with the setting of air quality standards, a number of measures :

- setting of car air emission standards;
- voluntary agreement with car manufactures to decrease CO<sub>2</sub> emissions; and
- measures to encourage the development of clean vehicles.

The **Council Directive 70/20/EEC** sets up the first legal controls on vehicle emissions. Various amendments to this Directive have seen the gradual reduction of emissions standards, coupled with the improvement of exhaust testing methods and the introduction of control technologies, such as catalytic converters and on-board diagnostics systems.

The key standards regulating vehicle emissions are known as the EURO standards. They regulate:

- Hydrocarbons(HCs) ;
- Carbon monoxide(Co) ;
- Nitrogen oxides(NOx) ; and
- Particulate matter(PM).

**Directive 98/69/EC** establishes EURO III standards(implemented January 2000), EURO IV standards, which are to be implemented by January 2005 and EURO V standards, to be implemented in 2008.

- **Protected areas and biodiversity**

The main EU legislation on protected areas is the 1992 Habitats Directive, which aims to contribute to the maintenance of biological diversity in the EU, by establishing a European ecological network of representative sites, Natura 2000, and ensuring that selected habitats and species are maintained and protected. Member States must identify and designate Special Areas of Conservation and take various measures to protect habitats and species within and beyond these areas, taking into account the economic, social and cultural requirements and regional and local characteristic.

The habitat Directive can provide useful benchmarks in relation to requirements for the conservation and management of protected areas. In particular, it requires:



- *positive nature conservation measures*: Member States have the choice as to whether or not to adopt management plans. They must take at least one type of measure: statutory, administrative or contractual measures;
- *Preventive measures*;
- *Assessment* of specific plans and projects likely to have a significant negative effect on Natura 2000 sites.

### **Integrated costal zone**

- **Coastal zone management**

There is no legislation as such on integrated costal management. However, the EU has produced a series of recommendations, guidance and studies, which could be of interest to those Mediterranean countries which intend to develop strategies and policy on costal zone management.

From 1996 to 1999, the Commission carried out a Demonstration Programme on Integrated Costal Zone Management (ICZM). The programme was designed to collect technical information and stimulate a debate among different stakeholders on costal zone management.

Based on the results of the Demonstration Programme, the Commission has adopted a Strategy on ICZ, which was followed by a Recommendation on the implementation of ICZM in Europe, adopted by the Council and the Parliament in may 2002. The Recommendation defines the steps that the States Members should take to develop national strategies for ICZM, due by 2006.

- **Tourism**

Although the Treaty on the European Union states that activities of the Community include measures in the sphere of tourism, the EU has not yet developed a specific policy or legislation in this sphere. Therefore, the activity of the EU in this field is indirect and limited to measures related to the integration of environmental considerations in tourism policy i.e. mainly encouraging the promotion of sustainable tourism initiatives.

### **Desertification**

- **Agriculture** (nitrates and pesticides).

The issue of nitrate pollution, which becomes a concern in MED countries due to the widespread use of fertilisers and poor treatment of human and animal waste, is covered by a specific directive, the nitrates **Directive Council Directive 91/676/EEC**). The nitrate Directive requires Member States to identify vulnerable zones which are, or may be, affected by nitrate pollution. Action programmes must be established for these zones. Nitrate pollution must also be prevented outside vulnerable zones through the development of codes of good agricultural practice. In addition the Directive set up monitoring requirements relating to nitrate concentration in surface and groundwater waters.

About pesticides...the EU has developed an extended regulatory framework on the use of pesticides. In particular **Directive 91/414** defines rules for the authorisation of plant protection products and requires a risk assessment before placing on the market of these products. Community rules also set up maximum residue limits (MRLs) on food and foodstuffs. MRLs are set up for both raw agricultural products and processed products and composite foodstuffs. In order to minimise the detrimental environmental impact of pesticides the EU seeks to ensure

their correct use and informs the public about their use and any residue issues.

## **2) Capacity building; awareness enhancement and exchange of experiences.**

### **Environmental Management Tools.**

- **EIA Directive**

The EIA Directive (EU legislation) on Environmental Impact Assessment of the effects of projects on the environment was introduced in 1985 and was amended in 1997. Member States have to transpose the amended EIA Directive by 14 March 1999 at the latest.

The EIA procedure ensures that environmental consequences of projects are identified and assessed before authorisation is given. The public can give its opinion and all results are taken into account in the authorisation procedure of the project. The public is informed of the decision afterwards.

- **SEA Directive**

The purpose of the SEA-Directive is to ensure that environmental consequences of certain plans and programmes are identified and assessed during their preparation and before their adoption. The public and environmental authorities can give their opinion and all results are integrated and taken into account in the course of the planning procedure. After the adoption of the plan or programme the public is informed about the decision and the way in which it was made. In the case of likely transboundary significant effects the affected Member State and its

public are informed and have the possibility to make comments which are also integrated into the national decision making process.

SEA will contribute to more transparent planning by involving the public and by integrating environmental considerations. This will help to achieve the goal of sustainable development.

on 5 June 2001 the Council formally adopted the **SEA Directive 2001/42/EC**.

### **3) networking including with civil society.**

#### **Information.**

- **Recommendation on Environmental Inspection**

IMPEL (European network for the implementation and enforcement of environmental law) is an informal network of European regulators concerned with the implementation and enforcement of environmental legislation. The network is a powerful tool for sharing experience and information on the practical application of environmental legislation across Europe. Co-operation among practitioners in the fields of inspections, permitting and enforcement under the IMPEL network started in 1992. 30 countries - all Member States of the European Union, the two acceding countries Bulgaria and Romania, the two candidate countries Croatia and Turkey as well as Norway - and the European Commission now participate in the network.

IMPEL's work is explicitly recognised in the 6<sup>th</sup> Environment Action Programme. Article 3.2 is about encouraging more effective implementation and enforcement of Community legislation on the environment which requires, among other things:



- Promotion of improved standards of permitting, inspection, monitoring and enforcement by Member States

- Improved exchange of information on best practice on implementation including by the IMPEL network within in the framework of its competencies.

- **IPPC Directive**

The EU has a set of common rules for permitting and controlling industrial installations in [the IPPC Directive](#) of 1996.

The IPPC Directive applies to the most polluting industries and introduces an integrated approach to permitting based on Best Available Techniques(BAT), combined with emission standards for the main polluting substances.

It is the main EU instrument related to permitting. The Directive contains interesting concepts and approaches for convergence. Firstly, it introduces a permitting assesment procedure based on use of BATs and compliance with environmental quality standards. It also ensures close co-ordination between the different permitting authorities. The IPPC systyem covers all environmental impacts i.e. the permit does not cover emission limit values, but also sets requirements for self-monitoring, reporting, accident notification, energy efficiency and raw material use, waste minimisation.

- **Seveso Directive**

The Seveso Directive(96/82/EC) regulates the control of major accidents involving dangerous substances, complements the IPPC Directive. It also operates through regulatory controls of the activities on a site and links health and safety issues to those environmental ones, therefore providing useful benchmarks in relation with the regulation of the use of dangerous

substances at certain establishments and major accident prevention policies, safety reports and emergency plans.

- **The Aarhus Convention.**

The United Nations Economic Commission for Europe (UNECE) [Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters](#) (pdf ~50K) was adopted on 25 June 1998 in the Danish city of Aarhus (Århus) at the Fourth Ministerial Conference as part of the "Environment for Europe" process. It entered into force on 30 October 2001.

The Aarhus Convention establishes a number of rights of the public (individuals and their associations) with regard to the environment. The Parties to the Convention are required to make the necessary provisions so that public authorities (at national, regional or local level) will contribute to these rights to become effective. The Convention provides for:

- the right of everyone to receive environmental information that is held by public authorities ("**access to environmental information**").
- the right to participate in environmental decision-making ("**public participation in environmental decision-making**");
- the right to review procedures to challenge public decisions that have been made without respecting the two aforementioned rights or environmental law in general ("**access to justice**").

## Sitography

The present work was achieved with the help of the following sites:

[EI\\_Syria.pdf](#) (183k)

[EI\\_Turkey.pdf](#) (109k)

[OECD\\_policy\\_brief.pdf](#) (248k)

[Helsinki.doc](#) (132k)

<http://smap.ewindows.eu.org/>

[Clearing\\_house\\_ICZM.doc](#) (671k)

[Clearing\\_house\\_water.doc](#) (962k)

A Comparative Assessment of Links Between Irrigation Water Pricing

Formato file: PDF/Adobe Acrobat - [Versione HTML](#)