



**Sustainable Water Integrated Management (SWIM) - Support Mechanism**

**Project funded by the European Union**

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**COST ASSESSMENT OF WATER DEGRADATION (CAWD)  
IN SELECTED SOUTHERN MEDITERRANEAN COUNTRIES**

**CONCEPT NOTE FOR 2ND SC IN BRUSSELS**

**16 TO 17 OCTOBER 2012**

**ACTIVITIES PROPOSED FOR 2013 & 2014 PLAN OF ACTIONS**



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## I. BACKGROUND

1. The Southern Mediterranean Region, comprising the Project Countries<sup>1</sup> ( PC) of Jordan, Syria, Lebanon, Israel, Egypt, The Occupied Palestinian Territory, Tunisia, Algeria, and Morocco are faced with the issues of water scarcity, salinity, water logging, bacteriological and chemical contamination, and dam sedimentation. These issues affect directly and indirectly all water and land uses, namely agriculture, fisheries, domestic use, sanitation, health, industry, hydropower, tourism and biodiversity
2. The water and soil concerns are at the heart of the water policies in the PC and the mainstreaming of water resources and land use. Governments invested considerably in building an increasingly integrated hydraulic infrastructure (dams, wells, installations to recharge aquifers, desalination, treatment of wastewater, water transfer...). During the last decade, significant progress was made in the decentralization of water resource management, mainly focused on participatory management methods, accompanied by technical and financial support by the State.
3. These problems are widely acknowledged at national level through a series of technical reports and economic studies of degradation which was spearheaded first by the Mediterranean Environmental Technical Assistance Program ( METAP) in its cost of environment degradation<sup>2</sup> (COED) regional program and subsequently by the the European Commission on the Analysis for European Neighbourhood Policy (ENP) Countries and the Russian Federation<sup>3</sup> on social and economic benefits of enhanced environmental protection as shown in Figure 1 below. The estimates, however, cannot be used directly to provide an operational response as they did not consider the costs and benefits of possible solutions to the watershed degradation problems. In fact less is known at a more detailed river basin level as no accurate identification of problems and evaluation of the associated costs of degradation have been undertaken so far. However it is at the basin level, that decisions has to be taken as to the management, and the protection of the water resources in full collaboration with local authorities and in particular the regional/local wastewater establishment

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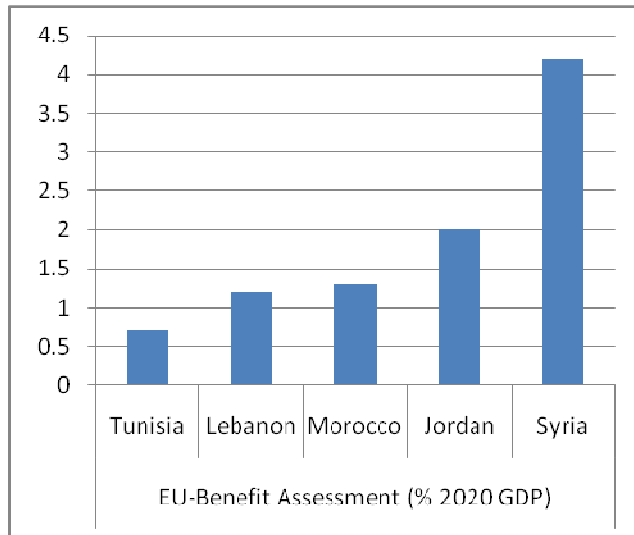
<sup>1</sup> hereinafter abbreviated and being referred to as „PC“

<sup>2</sup> Sarraf et al, Cost of environmental degradation, METAP/The World Bank, 1999-2005

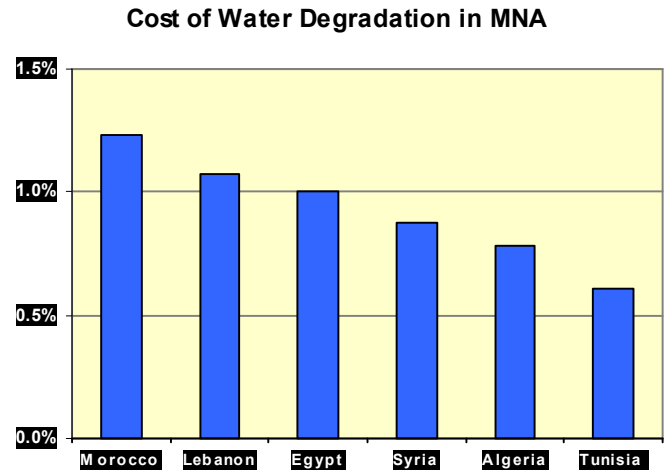
<sup>3</sup> <http://www.environment-benefits.eu/>



Figure 1: EU-Benefit Assessments<sup>4</sup> ( 2012)



METAP Cost of Water Degradation<sup>5</sup> ( 2002-2005)



4. Costs of water degradation and costs of water remediation can be used in making decisions about water resources protection activities. They are generally used in making the following type of decisions:
  - choice of general priorities based on cost-benefit ratios (e.g. to invest in waste water treatment or in forestation),
  - choice of concrete projects and activities based on cost-benefit ratios or Net Present Value (NPV),
  - general or project priorities based on analysis of cost-effectiveness (in cases where monetary valuation is difficult),
  
5. SWIM-SM has included in its work package # 1, a regional activity on the cost assessment of water degradation (CAWD) at the basin level. The overall objective is to assist national and local decision-makers in identifying concrete actions to improve watershed management in selected PC through the potential for financing projects that will derive environmental benefits and reduce externalities. To achieve the overall objective, there is a need to improve the investment opportunities of the government at the sub-national or basin level in order to effectively curb water degradation. The CAWD activity already started in May 2012 in two countries Morocco and Tunisia and will be completed in December 2012.
  
6. SWIM-SM has also included in its work package# 2, a Capacity Building (CB) program : The purpose is to support the strengthening of stakeholders' capacity at regional level and contribute to the empowerment of water related institutions; identify competent national and regional training institutions so as to serve as 'networks/centres of reference' and to prepare a regional roster of experts from the PC countries who can deal successfully with sustainable water management issues in the region. A capacity building program described un section ... below will accompany the CAWD by building a sustainable expertise in environmental economic.

<sup>4</sup> <http://www.environment-benefits.eu/>, adapted by Fadi Doumani , October 2012

<sup>5</sup> Sarraf et al, Cost of environmental degradation , METAP/The World Bank, 1999-2005



- 7. This concept note therefore will describe the elements of the study on the cost assessment of water degradation as well as the capacity building program in environmental economics

## II. WORK PACKAGE 1.2: COST ASSESSMENT OF WATER DEGRADATION(CAWD)

- 8. The selection of the basins that were identified in this program, was based on one or many of the following criteria:
  - a) The water way is a major river in the country and is a source of potable water, and irrigation
  - b) The basin is a country priority for socio economic development and for integrated water demand management, however socioeconomic development in the basin has not kept pace with that of other regions in the country
  - c) Rural population and livestock pressures on the land, coupled with inadequate land management, over exploitation of groundwater increasingly induce resource degradation
  - d) Water pollution is an issue for water quality
  - e) Climate change is emerging as a major challenge for the agricultural sector with or increased incidence of flash floods
- 9. The two basins, namely the Oum Er Rbia basin in Morocco and the Medjerda basin in Tunisia, fulfil the that are under investigation, fulfil the above criteria. The characteristics of the two basins are highlighted in the table below. The preliminary qualitative analysis showed

Oum Er Rbia Basin	Mdejeda Basin
<ul style="list-style-type: none"> <li>• Length of River: 600 kms</li> <li>• Watershed Basin: 48,000 Km<sup>2</sup>, 7% of the surface of Morocco</li> <li>• Population : 5.0 million ( 15% of total population), rural 3.0 million</li> <li>• Largest irrigation area and largest hydro-electrical production ( 15 dams)</li> <li>• Major source of potable water for Casablanca and Marrakech</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Length of River: 450 kms (350 kms in Tunisia)</b></li> <li>• <b>Watershed Basin: 15,930 Km<sup>2</sup>, 9.7% of the surface of Tunisia</b></li> <li>• <b>Population: 1.33 million ( 9.7% of total population) rural 0.9 million</b></li> <li>• <b>Includes 25% of the most fertile agricultural and 9 dams</b></li> <li>• <b>Major source of potable water for 2.5 million</b></li> </ul>

that both basins are prone to flood and draught; and that water quantity is more of an issue than water quality as water variability and allocation will be exacerbated by Climate Change in the future.. Such climate variability will impact on agricultural productivity and social adaptation during the humid season and on high nitrate and salinity content during the dry season. Economic assessment of these impacts is ongoing will be completed at the end of November 2012

- 10. In the original work plan of SWIM for 2013, it was proposed to select two additional basins; The Seybouse Basin in Algeria and the Litani Basin in Lebanon. The Seybouse basin is situated in the northern eastern part of Algeria with a surface area of 6417 Km<sup>2</sup>. The Seybouse river of 240 kms long is major source of water for large scale irrigation and is heavy polluted from industrial discharges of 4.5 million



m<sup>3</sup>, untreated waste water and agricultural run off. During the identification mission of the CAWD, the SWIM team and Tunisian counterparts proposed that the Medjerda subwatershed of 7870 Km<sup>2</sup>, situated in the far east of Algeria and is part of the larger Medjerda Mellugue watershed, be selected as the Medjerda river originates in Algeria and crosses over Tunisia. The high part of the river of 107 kms long<sup>7</sup> is also polluted from industrial discharges and agricultural run off and would also affect the water quality downstream in the Tunisian part. The river also includes the *Ain-Edalia* dam of 78 million M<sup>3</sup> capacity which supplies the drinking water for the region of Souk-Ahras as well as several other localities. Undertaking the CAWD to cover the Algeria part of the Medjerda basin could serve as an example of two PCs working together on the same basin with shared water resources. It will also enable the Algerian and Tunisian experts to work together on the remediation measures of the Medjerda river based on the results of the economic assessments. This will serve as an example of a genuine south-south cooperation advocated by SWIM

11. The Litani is considered the most important river of Lebanon, It is about 170 km long and has a watershed of some 2,181 km<sup>2</sup>.<sup>8</sup> The main uses of Litani river is irrigation, hydroelectric production, potable water and agro business industry. The Al Qaraoun dam with the capacity of 220 million m<sup>3</sup> is built on the river. The Litani is faced with seasonal risk of water scarcity, chemical and bacteriological contamination, floods and salinity. The Litani basin therefore fulfils the selection criteria for carrying a CAWD for this basin

#### A. OBJECTIVE AND DESCRIPTION OF THE STUDY

12. The objective of this study is to estimate the annual costs of water degradation of the Medejera river in Algeria and link the results with those of the Tunisian part river, as well as of the Litani river in Lebanon..
13. Each of the two studies will:
  - a) assess the costs of environmental degradation caused by water contamination, salinity, water logging floods risk, dam siltation. In particular, it will estimate in monetary terms the impact of each problem on all water uses, to the extent that data allow.
  - b) identify a priority for intervention (investment projects) in a specific location of the river, particularly affected by pollution or natural resources degradation
  - c) undertake an economic analysis (such as cost-benefit analysis or cost effective analysis) of potential interventions necessary to reduce water pollution/ natural resource degradation in the areas previously selected; and will identify cost-effective measures to reduce pollution and natural resources degradation and improve the overall quality of the river.

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<sup>6</sup> Merzoug A, and Merazig H., Water pollution of Oued Medjerfa in Souk Ahras Region, <http://www.docstoc.com/docs/122799102/Water-pollution-of-oued-medjerda-in-algerian-souk-ahras-region#>

<sup>7</sup> S. Ouled Zaoui, S. Snani, Y. Djebbar, Management of Water Resources in Souk Akhras region, Fourteenth International Water Technology Conference, IWTC 14 2010, Cairo, Egypt

<sup>7</sup> Fadi Comair, L'efficience d'utilisation de l'eau et approche économique, Plan Bleu July 2011



## B. EXPECTED OUTPUTS

14. The output will be a **report** for each of the water basin . The report will:
- (i) present an overview of the problems affecting the river;
  - (ii) identify and estimate the impacts of each problem on all water uses;
  - (iii) identify a priority for intervention (investment projects) aiming to reduce water pollution and maximize the benefits from water use in a specific area of the river;
  - (iv) undertake an economic analysis of the selected intervention and
  - (v) provide concrete recommendations in the form of investment plans to internalize environmental benefits and improve watershed management

## C. METHODOLOGY

15. The cost of water degradation is a measure of the loss in a nation's welfare due to water degradation and depletion. The damage cost will be expressed as percentage of GDP. It includes losses at three levels:
- social, e.g. premature death, pain and suffering from illness due to inadequate quality of drinking water
  - economic, e.g. reduced soil productivity due to irrigation with saline water;
  - environmental, e.g. reduced recreational value for lakes and beaches due to water contamination
16. The estimation process often uses a variety of valuation methods, depending on data availability. Direct uses are usually easier to estimate than indirect uses. Valuation methods range from market pricing (e.g. to estimate the loss of fish production due to water pollution) to demand curve approaches (e.g. the loss of tourism opportunities due to water pollution can be valued based on the Travel Cost Method or Contingent Valuation Method) and non-demand curve approaches (e.g. the decline in health due to water contamination can be valued by using the cost of illness approach). Indirect uses are usually more difficult to estimate than direct uses. For example, the contribution of the water-contaminated crops to the consumer health is often hard to quantify: water contamination is only one of the many factors (e.g. soil pedology, fertilizers etc) which contribute to the decline in health.

## D. STUDY'S BENEFITS

17. By assigning monetary values to water degradation at river basin level, the study:
- (i) provides a comprehensive and holistic approach for assessing the impacts of water degradation;
  - (ii) offers a useful instrument to rank the different types of degradation costs according to their relative importance;
  - (iii) gives decision-makers a tool to improve the integrated water resource management at river basin level
  - (iv) improves the investment opportunities of the government at the governorate/watershed/basin and sub-national levels in order to effectively curb water degradation
  - (v) associates the stakeholders and interest groups in the identification of the water issues, definition of remediation plans and preparation of investment plans



### III. WORK PACKAGE 2: CAPACITY BUILDING IN PCS FOR CAWD

#### A. INTRODUCTION

18. A main obstacle to conducting policy-relevant studies based on environmental economics is the shortage of human capacity at the ministries and local universities. In fact, there is a limited number of research and academic institutions that offer courses on environmental economics, and CAWD is a pioneering methodology that has yet to be disseminated and fully applied. The situation in the government institutions is even less favourable; whereas there are a very limited number of environmental economists compared with environmental specialists who needs economic tools to support decision-making. CAWD methodology is a tool that enables key professionals to carry out assessments of the economic cost of water degradation.

#### B. PROJECT OBJECTIVE AND DESCRIPTION

19. The purpose of this activity is to anchor the CAWD work in the region in order to enhance regional capacity in environmental economics. This will entail the dissemination of the CAWD methodology through case studies and training. The targeted audience includes: government staff working on environment and development issues with relevant expertise, namely trained economists and environmental/ water specialists. In addition, academics (including post-graduate students) and researchers are also included in the desired target group.
20. The activity will consist of:
- a. Developing a course with training materials and case studies (on the CAWD of Oum Er Rabia and the other on the Medjerda) on the COED methodology and its application and the use the EU Water Framework Directive (WFD) methodology and the context/benefits of economic valuation at the decision-making level. The course duration will be for 5-7 working days to allow for non-resident professionals to attend.
  - b. Delivering the course twice during 2013; one in English for the Mashrek countries and the other in French for the Maghreb countries. This course is intended for training of trainers and for professionals that would apply such methodology in their work.

#### C. EXPECTED OUTPUTS

21. The proposed outputs are as follows:
- a. Prepare 2 case studies on CAWD of Oum Er Rbia and Medejerda
  - b. Develop a training course on CAWD
  - c. Deliver the course twice to 20-30 professionals: one for the Maghreb countries and the other for the Mashrek countries

### IV. PARTNERSHIP AND SYNERGY

22. The proposed program will establish synergy with:





- a) **The Marseilles Center for Mediterranean Integration<sup>9</sup>** which includes among its on-going activities the Environmental Economic Evaluation Program (EEEP) and the Economic Approach to Water Demand Management. The EEEP which is led by the Plan Bleu under the GEF-financed Sustainable Mediterranean Program ( Sustainable Med) aims assisting the decision makers in making informed decision of sustainable use of natural resources management. CAED will complement the on-going programs of the Economic valuation of benefits provided by Mediterranean marine and coastal ecosystems; Waste and material flows;; Economic impacts of extreme climate events; Economic assessment of Mediterranean Forest ecosystems services. The Economic Demand Management Program is led by the French Development Agency and aims at assisting the Mediterranean Countries to develop adopt policies for water demand management. Comparative assessment studies on 14 countries for potential water savings were prepared by national consultants. The CAED will provide the economic dimension of water degradation which has not been addressed in these studies.
  - b) **The Mediterranean Network of Basin Organization (MNBO)<sup>10</sup>** is promoting an integrated water resources management at the river basin level, as a tool for sustainable development. It assists in the information exchange, facilitate the implementation of the water management tools and develop information and training program. In collaboration with the Global Water Partnership (GWP). GWP-Med, which is consortium member of SWIM-SM, the results of the COED will be shared with MNBO that could disseminate the studies to its 30 members. MMBO will also be consulted during the preparation of the capacity building program for seeking training materials related to river basin management
  - c) **The Horizon 2020 Initiative<sup>11</sup>** aims depolluting the Mediterranean by the year 2020 by reducing land based of pollution. The Horizon 2020 is the “twin” environmental program of SWIM. A line communication and collaboration has been established between these two initiatives. The Ministries of the Environment are strongly supporting the CAWD program as it will assist them to develop environment policies based on economic evaluation. The CAWD will be shared with the focal points of the Horizon 2020 and the cost effective investments which will be identified by the CAWD studies will be shared with the The Mediterranean Hot Spots Investment Programme – Project Preparation and Implementation Facility (MeHSIP).
23. The proposed capacity building program will be implemented in close collaboration with the **ENPI Horizon 2020 Capacity Building/Mediterranean Environment Programme (H2020 CB/MEP)**. Already SWIM\_SM has been aligned with the CB MEP Work Plan aiming to continue and expand CB MEP’s activities related to water.

## V. PROGRAM IMPLEMENTATION

24. This program will be implemented by the SWIM-SM key experts with the assistance of the Non Key experts in water policies and institutions ,environmental economics and training . The tentative schedule for implementation is as follows:

Months/activity		1	2	3	4	5	6	7	8	9	10	11	12
CAWD Medejerda Algeria	Identification Mission	...											
	Data Analysis		.....	..									
	Draft Final Report					.....							
	Consultation							...					

<sup>9</sup> <http://cmimarseille.org/Environmental-Economic-Evaluation.php>

<sup>10</sup> <http://www.inbo-news.org/mot/mediterranean?lang=en>

<sup>11</sup> <http://www.h2020.net/>

