

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



Project funded by
the European Union

Water is too precious to waste

Cost Assessment of Water Degradation

**SWIM 2nd Steering Committee,
17-18 October 2012, Brussels**

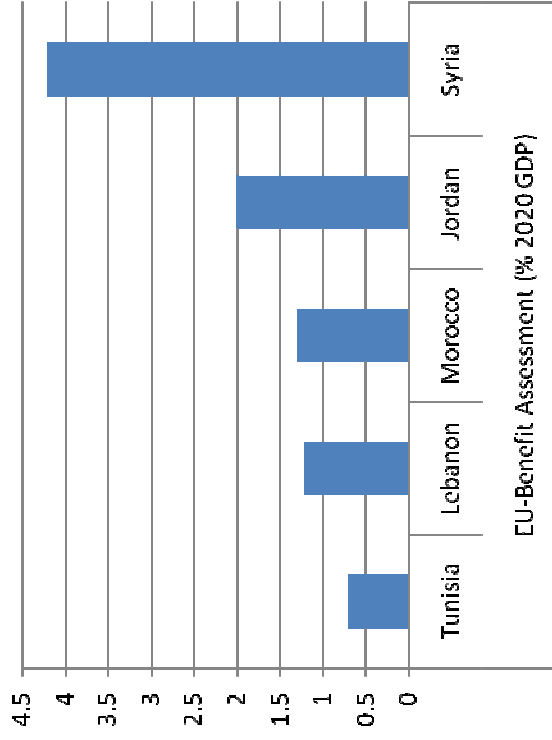
Presented by: Dr. Sherif Arif, Senior Environmental Consultant, SWIM-SM

Why An Economic Valuation of Water Resources

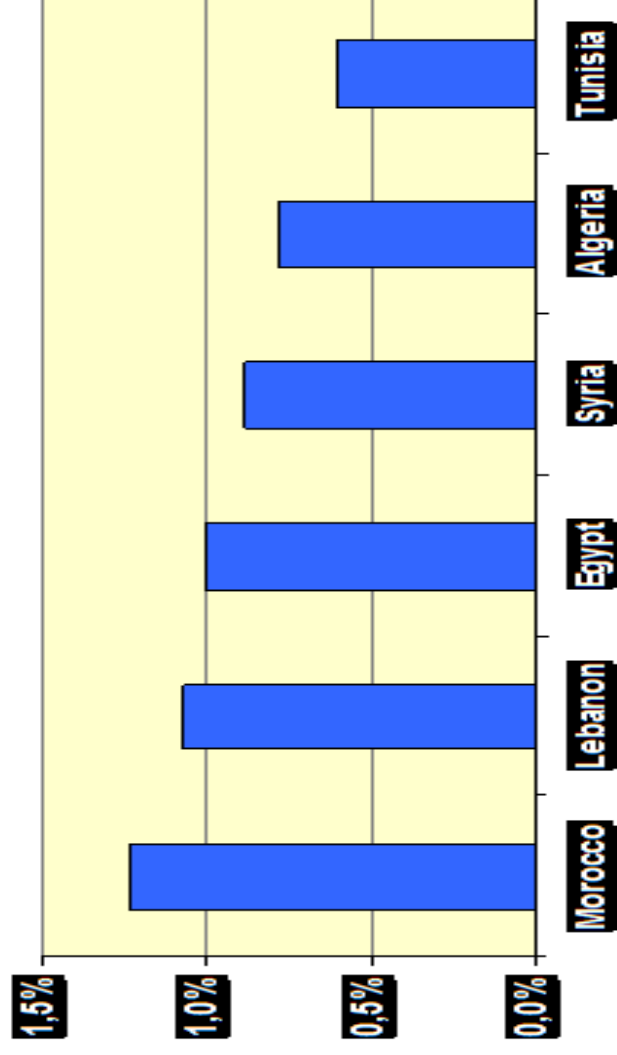
- The SWIM project countries are faced with the issues of water scarcity, salinity, water logging, bacteriological and chemical contamination, and dam sedimentation. These issues affect directly and indirectly all water and land uses, namely agriculture , fisheries ,domestic use, sanitation, health, industry, hydropower , tourism and biodiversity
- Much of the past interventions have been on investments without a systematic evaluation of the benefits achieved, and without consideration of other investments’ alternatives that would generate both economic and environmental benefits.
- It is important to distinguish between the costs due to the inherent scarcity of the resource, and the *increased* costs due to non-optimal use of the resource.

The Cost of Water Degradation was Estimated by the EU (2010) and METAP (2002-2005)

-



Cost of Water Degradation in MNA



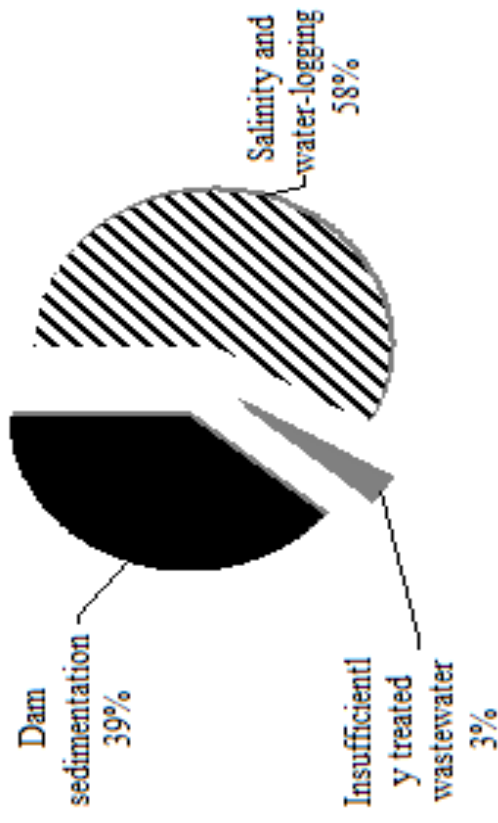
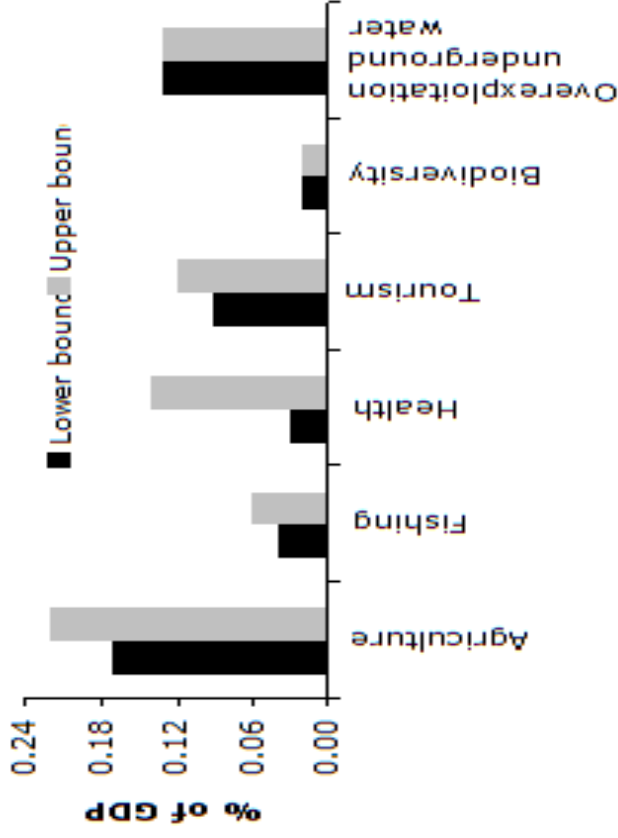
Sarraf et al, Cost of Environmental Degradation, METAP/World Bank 1999-2005

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

Example: Tunisia

Annual Cost of Water Degradation: 0.6% of GDP or 203 million TD in 2004.

Impact on Agriculture



However, these estimates are limited

- These estimates in terms of orders of magnitude were useful to alert policymakers about the seriousness of the water degradation problem.
- They cannot be used directly to provide an OPERATIONAL response as they did not include the costs and benefits of possible solutions to the watershed degradation problem which would affect the NON OPTIMAL USE of THESE RESOURCES.
- 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

Cost of Water Degradation and Remediation are used to take 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),

SWIM-SM has included in its work plan a Regional Program on the cost of water degradation at the Basin level

- **Water Governance and Mainstreaming ;**
 - This Program will associate the stakeholders and interest groups with the identification of the water issues, and development of remediation plans
 - It will mainstream the water costs into agriculture and irrigation sectors
- **Capacity building**
 - This Program will build capacity on environmental valuation techniques and methodology
- **Application of water management plans**
 - This Program will enable costs and benefits to be reflected into water management plans that are prepared by the PCs
 - It will stimulate south-south exchange of information and results particularly in terms of taking decisions based on economic benefits and
- **Development of Communication and Awareness Raising**
 - This Program will raise awareness concerning the impacts of economic implications of water pollution , and the costs necessary to remediate the degradation of the ecosystem.

Criteria for the Selection of the Basins

- The water way is a major river in the country and is a source of potable water and irrigation
- 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
- Rural population and livestock pressures on the land, coupled with inadequate land management , over exploitation of groundwater increasingly induce resource degradation
- Water pollution is an issue for water quality
- Climate change is emerging as a major challenge for the agricultural sector with increased incidence of flash floods

Objective

- The overall objective is to estimate the annual costs of water degradation and remediation of selected basins in the SWM Partner Countries
- The study will assess the impacts of water salinity, contamination, water-logging, dam sedimentation and overexploitation of groundwater, climate change variability, pollution on the major economic sectors in selected basins

	Agriculture	Fishery	Domestic, sanitation, health	Hydropower	Industry	Tourism	Environment
Salinity							
Waterlogging							
Contamination*							
Sedimentation							

Description of the Study

- ❑ **Assess the costs of water 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.**
- ❑ **Identify a priority for intervention (investment projects) in a specific location of the river, particularly affected by pollution or natural resources degradation**
- ❑ **Undertake an economic analysis (such as cost-benefits 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.**

Methodology

- **The cost of water degradation is a measure of the loss in a nation's welfare due to water degradation and depletion. As such, 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, lower energy production due to dam sedimentation.
 - environmental, e.g. reduced recreational value for lakes and beaches due to water contamination
- **It places a monetary value on the consequences of such degradation. This often implies a three-step process:**
 - quantifying water degradation (e.g. monitoring water quality).
 - quantifying the impacts of degradation on different water uses (e.g. reduced agricultural production due to water salinity and waterlogging)
 - estimating the impacts in monetary terms (e.g. estimating the cost of soil productivity losses).

Benefits from the Program

By assigning monetary values to water degradation at river basin level, the study:

- Provides a comprehensive and holistic approach for assessing the impacts of water degradation;
- Offers a useful instrument to rank the different types of degradation costs according to their relative importance;
- Gives decision-makers a tool to improve the integrated water resource management at river basin level
- Improves the investment opportunities of the government at the governorate/watershed/basin and sub-national levels in order to effectively curb water degradation
- Associates the stakeholders and interest groups in the identification of the water issues, definition of remediation plans and preparation of investment plans

Implementation of the Regional Program for the Year 2012

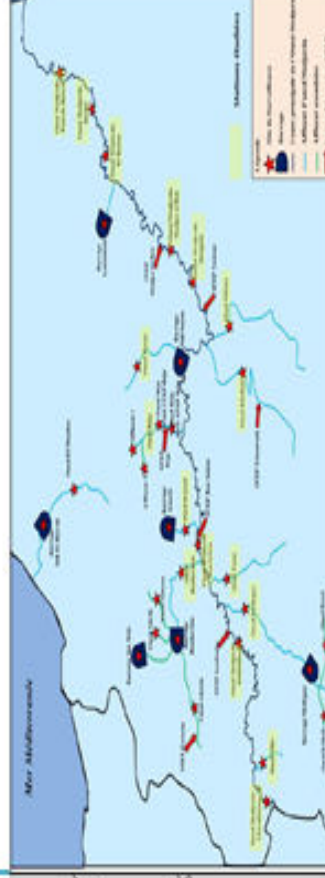
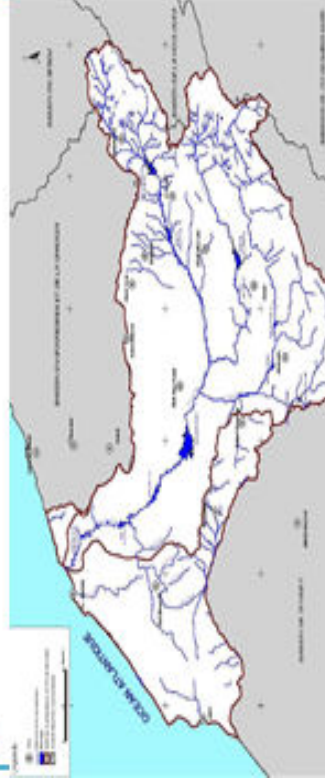
- Two Basins were selected on the basis of the criteria

Basin of Oum Er Rabia (Morocco)

- Length of River: 600 kms
- Watershed Basin: 48,000 Km², 7% of the surface of Morocco
- Population : 5.0 million (15% of total population), rural 3.0 million
- Largest irrigation area and largest hydro- electrical production (15 dams)
- Major source of potable water for Casablanca and Marrakech

Basin of Medjerda (Tunisia)

- Length of River: 450 kms (350 kms in Tunisia)
- Watershed Basin: 15,930 Km², 9.7% of the surface of Tunisia
- Population: 1.33 million (9.7% of total population) rural 0.9 million
- Include 9 dams and 2 5% of the most fertile agricultural
- Major source of Potable Water for 2.5 million



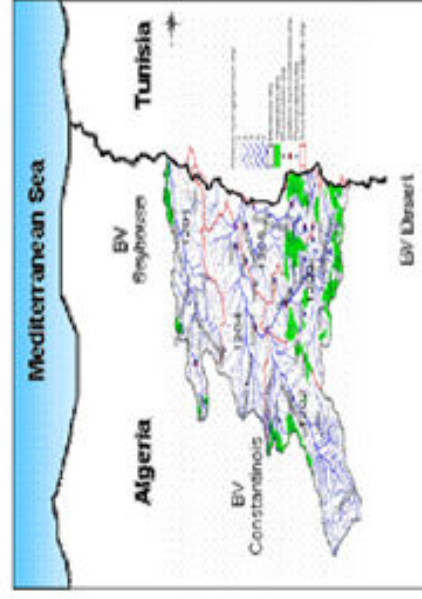
Proposed Program for 2013: CAWD for the Medjerda Basin In Algeria and Litani Basin in Lebanon

- **Cost of Water Degradation of the Medjerda Basin in Algeria.**
 - Originally the work plan included a CAWD for the Seybousse river in Algeria
 - Given that the CAWD of the Tunisia part of the DOWNSTREAM Medjerda Basin was undertaken in 2012, and since the Medjerda river originates in Algeria, it will be appropriate to cover also the Algeria part of the UPSTREAM the Medjerda Basin. This
 - Will enable to assess the CAWD for the entire river and
 - 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.
 - Will serve as an example of a genuine south-south cooperation advocated by SWIM
- **Cost of Water Degradation of the Litani Basin in Lebanon**
- **Capacity Building Program in Economic Evaluation**
 - Two sub-regional workshops : Mashrek and Maghreb

Characteristics of the Medjerda Basin (Algeria) and Litani Basin (Lebanon)

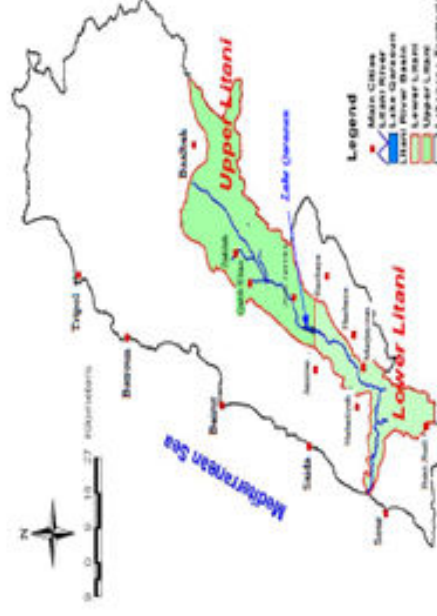
The Medjerda Sub Basin in Algeria

- Length of River 107 Kms
- Watershed Basin: 7870 Km² (0.33% of the total surface area)
- Major source of water for 1.2 million people
- Includes fertile agricultural lands and one Dam, Ain Edalia dam (78 Million m³)
- Prone to floods



The Litani Basin in Lebanon

- Length of the River: 170 kms
- Watershed Basin: 2168 Km² (20% of the total surface area)
- Major Source of potable water for 350000 people
- Irrigates fertile agricultural lands and one Dam Qaraoun (220 Million m³)
- Prone to floods



Expected Outputs

The Output will be a report for each of the two water basins .
The report will:

- Present an overview of the problems affecting the two river;
- Identify and estimate the impacts of each problem on all water uses;
- 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;
- Undertake an economic analysis of the selected intervention and
- Provide concrete recommendations in the form of investment plans to internalize environmental benefits and improve watershed management

Capacity Building in PCs for CAWD

The Purpose of this activity is to anchor the CAWD work in the region in order to enhance regional capacity in environmental economics.

The Activity will consist of :

- ❑ 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.
- ❑ 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.

Partnership and Synergies

This program will establish synergy with:

- **The Marseilles Center for Mediterranean Integration** through its Environmental Economic Evaluation Program and the Economic Demand Management Program for which CAWD will provide the economic dimension of water degradation
- **The Mediterranean Network of Basin Organization (MNBO)** to disseminate the study and seek collaboration for the capacity building program
- **The Horizon 2020 Initiative** to assist in the development of environment policies based on economic evaluation, and share cost effective investments with the The Mediterranean Hot Spots Investment Programme - Project Preparation and Implementation Facility (MeHSIP).

The Capacity Building Program will be implemented in close collaboration with the **ENPI Horizon 2020 Capacity Building/Mediterranean Environment Programme (H2020 CB/MEP)**.

Implementation Plan

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 workshop						...						
	Final report								.....			
CAWD Litani in Lebanon	Identification Mission	...											
	Data Analysis			.....	..						
	Draft Final Report					.....						
	Consultation workshop						....					
	Final report									.....		
Capacity Building Program	Development of training materials			.....								
	Delivering the course in Maghreb and Mashrek countries					.....						
	Final Report											....

Next Steps

The following steps are proposed to proceed with the implementation of this program :

- Review of the concept note by the SWIM Experts and the environment sector of the European Commission
- Share the concept note with the focal points Algeria and Lebanon for their comments and their willingness to participate
- Draft terms of references for individual experts and consultants, and proceed with their selection after obtaining EC approval

مع خالص شكري
وامتتاني

Thank you
for your attention

Merci pour
votre attention



*For additional information please contact:
Sustainable Water Integrated Management – Support Mechanism: info@swim-sm.eu*