

Sustainable Water  
Integrated Management (SWIM) -  
Support Mechanism



Project funded by  
the European Union

*Water is too precious to waste*

**Cost Assessment of Water Resources Degradation  
(CAWRD) of the Litani Basin  
General Context  
Consultation Meeting  
Sherif Arif  
Beirut, December 12, 2013**

# Why an Economic Evaluation of Water Resources

- Lebanon has 926 m<sup>3</sup>/capita of water availability in 2009 classifying it as the fourth best endowed country among the Middle East and North Africa Region. Despite this, there are still continued pressures on Lebanon natural resources especially in water, land use and forestry.
- The water resources are not evenly distributed among the different Lebanese regions and are also affected by seasons. Groundwater is severely exploited; there are 42,824 wells, pumping 0.35 BCM annually leading to a drop in the aquifer levels. Lebanon is using 2/3 of its available water resources. It is estimated that the seasonal imbalance of water resources will lead to chronic water shortages by as early as 2030 for which water demand would exceed the water resources supply by 190 MCM reaching 665 MCM in 2040

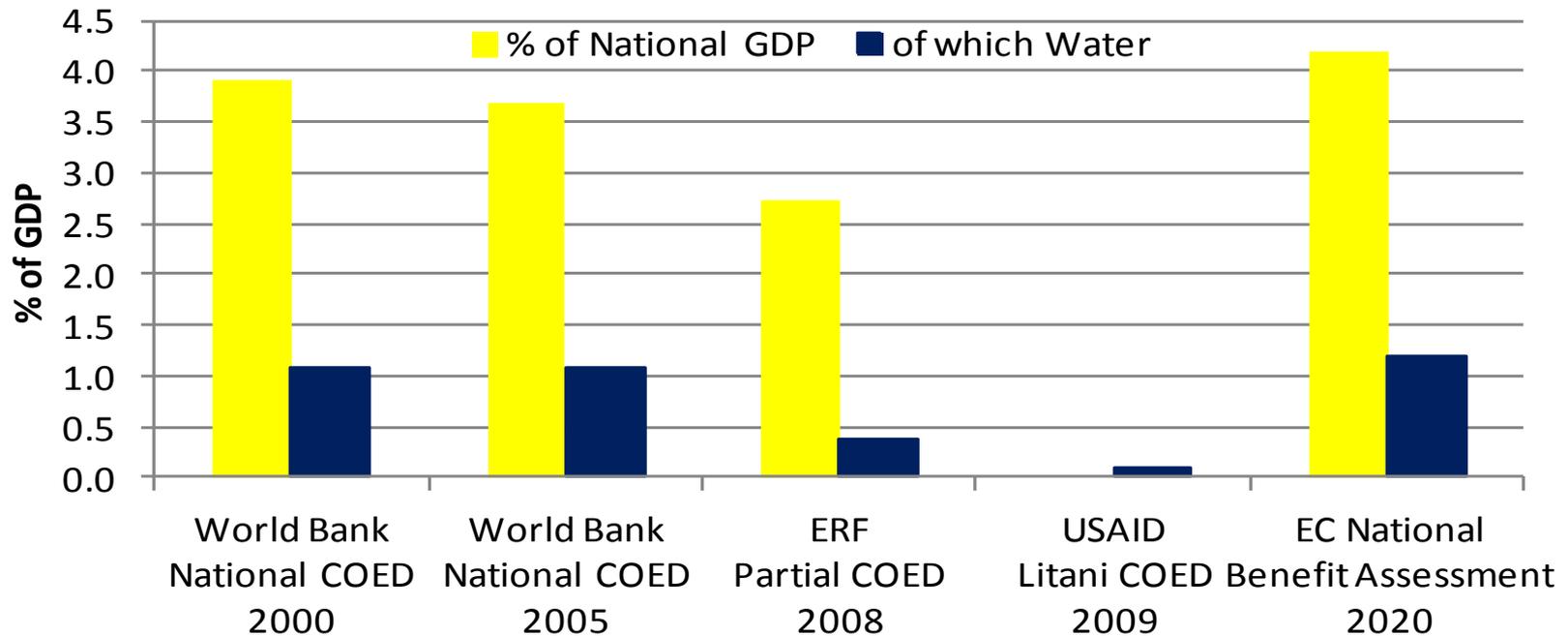
# Why an Economic Evaluation of Water Resources (ctd)

- There have been significant reform efforts in the past five years to initiate a series of reform in the water and wastewater sectors.
  - The Council of Ministers has adopted in March 2012 the National Water Sector Strategy (NWSS) with its 11 initiatives. The overall goal of the strategy is “to ensure water supply, irrigation and sanitation services throughout Lebanon on a continuous basis and at optimal service levels, with a commitment to environmental, economic and social sustainability”
  - MOEW has also completed a strategy in 2012 for the wastewater sector which complements the NWSS. The strategy proposes that 85% of the municipal and industrial wastewater be collected and treated at preliminary level by 2015 and 95% by 2020.
  - The Ministry of the Environment (MOE) at the request of the Council of Ministers, and the Environmental Parliamentary Commission has completed the preparation of the Business Plan for Combating Pollution of the Qaraoun Lake on the upper Litani River.

The Cost Assessment of Environmental Degradation has been estimated by METAP/The World Bank, the Economic Research Forum and the European Commission

## Degradations and Benefits

% of Lebanon GDP



**These estimates showed that the order of magnitude of water resources degradation vary from US\$ 233 million ( WB 1995) to US\$ 750 million ( EC, 2020)**

- ❑ **Water degradation is about 1.07 -1.08 % of GDP though these studies did not use the same methodology, did not cover all the water categories and the assessment years was different**
- ❑ **In relative terms, this percentage did not vary since the GDP growth is expected to be superior than the pollution increase**
- ❑ **In absolute terms, the cost of water resources degradation will increase from US\$ 233 million in 1995 to USD% 750 million in case pollution could not be reduced by 50% in 2020**

# However, these national 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.

# Decisions should be taken at the Basin level for the Management and Protection of Water Resources

- No precise problems identification and no monetary evaluation associated with water degradation have been undertaken at the Basin level in the Middle East and North Africa Region
- However, it is at the basin level that decision should be taken on the management and protection of water resources.

# Why An Economic Valuation of Water Resources at the Basin Level

- Much of the past interventions at the national level have been on “engineering” investments without a systematic evaluation of the benefits achieved, and without consideration of other investments’ alternatives that would generate both economic and environmental benefits.
- Less is even 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 have to be taken as to the management, and the protection and conservation of water resources

# Cost of Water Degradation and Remediation should be used to take decisions at the basin level

- 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),

# **The SWIM-SM is the First Project** that estimated the cost of water resources degradation and remediation at the Basin level

- SWIM-SM is a Regional Technical Support Program that promotes actively the extensive dissemination of sustainable water management policies and practices in the region given the context of increasing water scarcity, combined pressure on water resources from a wide range of users and desertification processes, in connection with climate change
- Its specific objectives are to :
  - (i) raise the decision-makers and stakeholders' awareness in the Partner Countries on existing and upcoming threats on water resources;
  - (ii) support the Partner Countries in designing and implementing sustainable water management policies at the national and local levels, in liaison with on-going relevant international initiatives; and
  - (iii) contribute to institutional strengthening, to the development of the necessary planning and management skills and to the transfer of know-how
- The Partners Countries (PCs) are: Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, the occupied Palestinian territory, Syria and Tunisia

# SWIM Support Mechanism: Project Components



**Water Governance and Mainstreaming: Focus on Governance Structures and Mainstreaming Water in Economic Sectors.**

**Capacity Building: Focus on Water Institutions , Empowerment and Enhancement of Centers of Expertise**

**Water Management Plans' application: Focus on South –South Exchange of experiences among water intensive sectors**

**Identification of good practices and success stories in the region and beyond . Focus on Lessons Learned in Water Management and Depollution of the Mediterranean**

**Development of a Communication and Awareness Raising Strategy: Focus on Bottom-Up Approaches Adapted to Regional & National stakeholders Inside and Outside the Water Sectors**

*The Cost Assessment of Water resources degradation is a sub-component of Water Governance and Mainstreaming*

# Why An Economic Valuation of Water Resources at the Basin Level

- **The Outcome of Work Package #1 on Water Governance and Mainstreaming includes:**
  - (a) Water considerations are promoted using a participative approach, also at local level;**
  - (b) Water concerns are mainstreamed in other relevant sectoral policies and in national development plans;**
  - (c) Economic valuation is carried out to assess the costs and benefits of mitigation actions on water degradation and**
  - (d) Climate change considerations are mainstreamed in national strategies, plans and policies, with primary emphasis on no-regret actions.**

# Achievement of the Outcome

In order to reach the outcome : A pillar on cost assessment of water resources degradation at the basin level was designed and implemented It consisted of 4 components:

- **Cost of water resources degradation due to water and waste water pollution**
- **Cost Benefit or Cost Effectiveness Analyses of Remedial Actions and Preparation of Investment Interventions**
- Building the capacity of the decision makers on the methodologies of economic evaluation
- Validation and Dissemination of the Investment Interventions

# 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

# Le Litani Basin Responds to these Criteria

- ❑ The Litani River is considered the most important and longest river of Lebanon. It originates at an elevation of 1,000 m near the city of Baalbeck (in the east), crosses most of the Bekaa plain and the south of Lebanon, and then flows into the Mediterranean Sea at Kassmieh, north of the city of Tyre. The Litani River is about 170 km long and has a watershed of some 2,181 km<sup>2</sup>.
- ❑ The watershed is home to a population exceeding 1 million living in 11 *caza* (administrative units) where about 160 villages can be found and which are mostly rural and agricultural character.
- ❑ The average water flow is about 770 MCM/year, accounting for some 30% of the water availability in the country. The Upper Litani comprising the area where the river drops from its springs (1,000 m elevation) to the Qaraoun Dam; with a storage capacity of 220 MCM of which 160 MCM are used annually for irrigation and hydropower generation and 60 MCM are used for water storage during the dry season.
- ❑ The basin is experiencing a number of problems relating to natural resources and linked to erosion, salinity, drought, floods and to a lesser extent dam siltation as well as serious problems linked to agricultural, municipal and industrial pollution.
- ❑ The Litani is thought to be a representative basin for a thorough analysis of costs and benefits related to the degradation and restoration of water resources in Lebanon.

# Objective of the CAWRD

- The main objective is to value the cost of water resource degradation (CAWRD) in a selected watershed to assist decision-makers at national and local levels to identify and prioritize specific actions to improve the management of this basin through potential funding of projects related to environmental and water benefits and the reduction of negative externalities.
- This allows to bring the costs of degradation to a common denominator to prioritize selected investments based on cost/benefit analysis

# Limitations of the CAWRD

The CAWRD is valued by using the available data – their source cannot be totally reliable. Moreover, due to the lack of data many hypothesis were assumed . The results are therefore considered as an indicative order of magnitude with lower and higher bound in order to take into account the uncertainties

# Description of the CAWRD

- ❑ 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.

# Approach

- The cost of water resources 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).

# General Benefits from the CAWRD

**By assigning monetary values to water degradation and remediation 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**

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Thank you  
for your attention

Merci pour  
votre attention



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