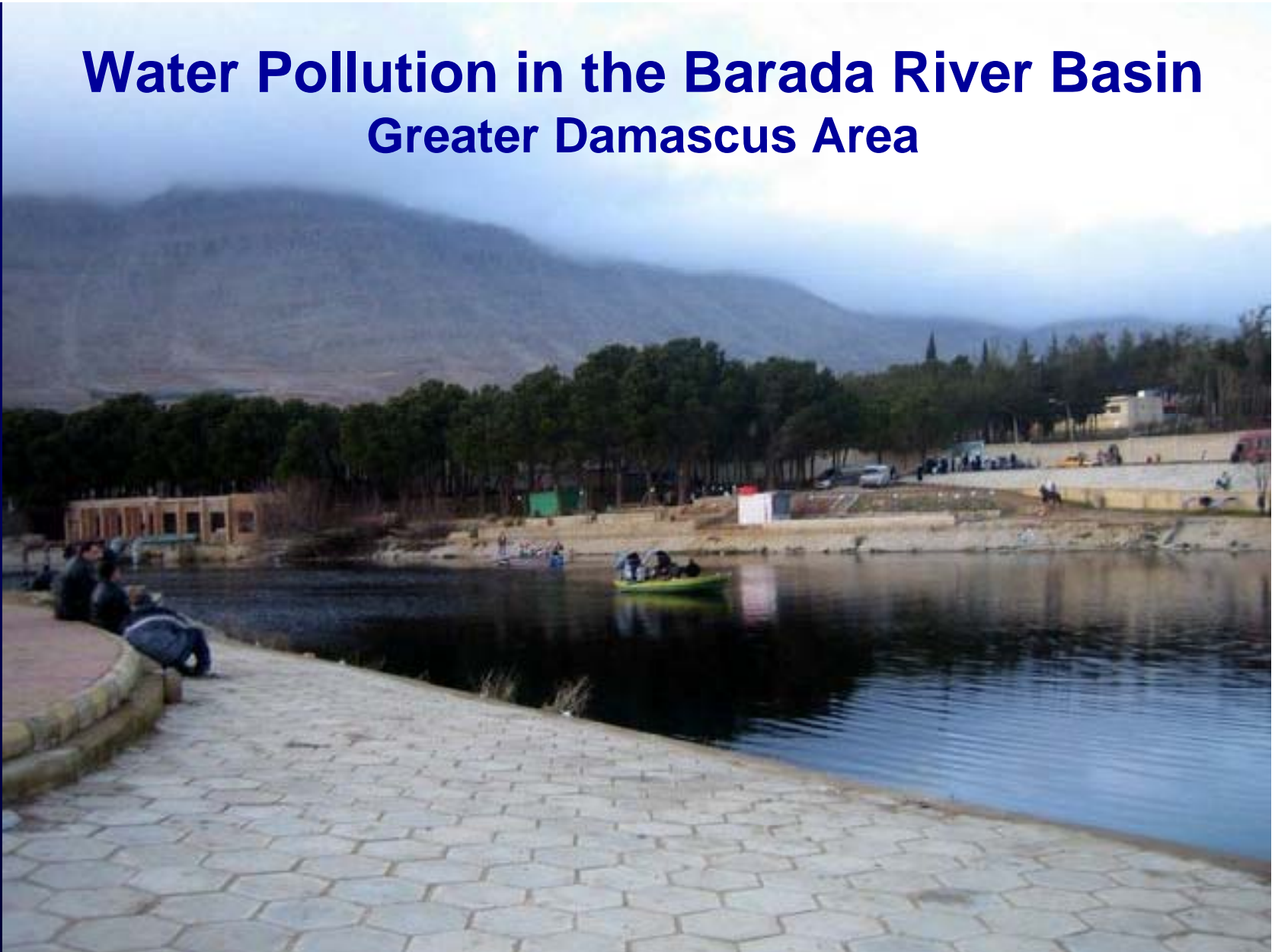


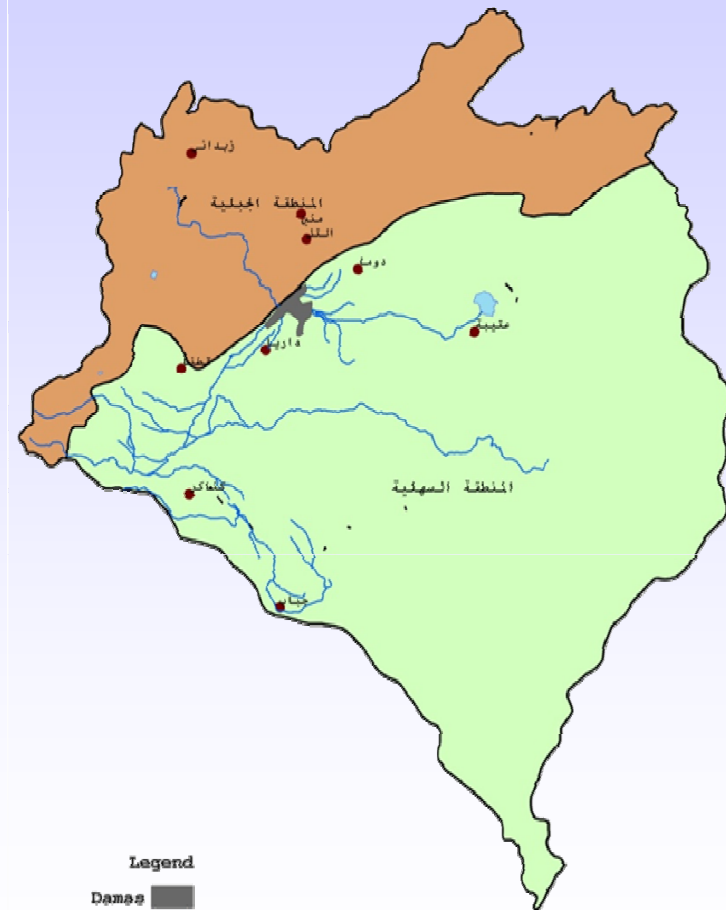
# Water Pollution in the Barada River Basin Greater Damascus Area



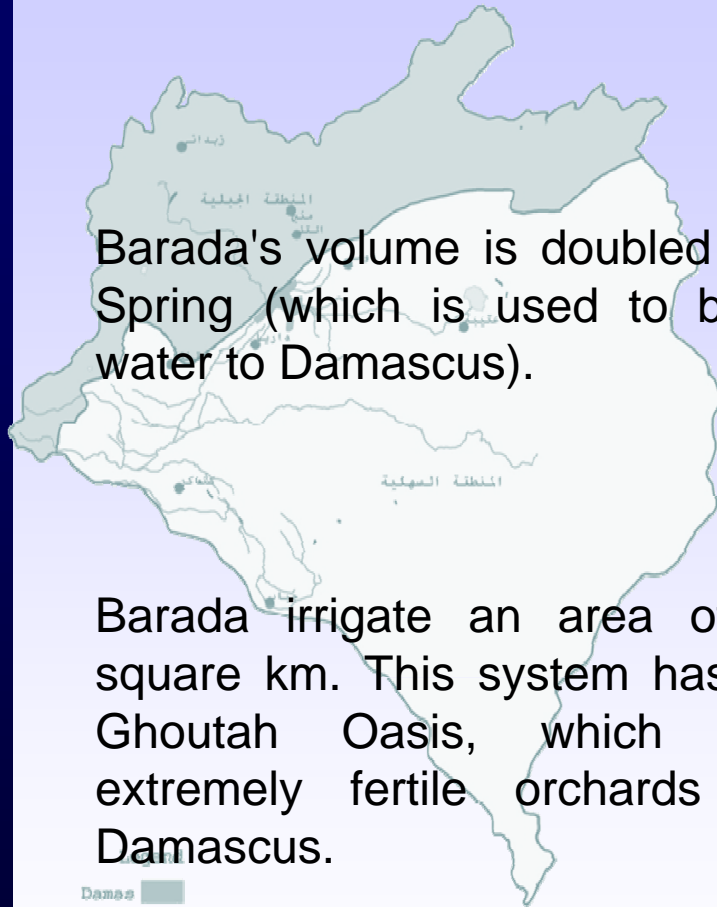
## Overview of the Basin

Barada River: It rises in mountains north west Damascus, and flows southward for 84 km through Damascus to arrive intermittently al-Utaybeh Lake

The Barada Basin is the area where the capital of Syria, Damascus, is located, and therefore the region that concentrates most of the human activities in the country.



# Overview of the Basin



Barada's volume is doubled by the Fijeh Spring (which is used to bring drinking water to Damascus).

Barada irrigate an area of about 375 square km. This system has created the Ghoutah Oasis, which consists of extremely fertile orchards surrounding Damascus.





## Overview of the Basin

The total population of the basin is about 5 million with 2.4 increasing rate. The demand for water, water sanitary services and new wastewater treatment facilities will be increase also.





## Water Pollution in the Barada River Basin

The discharge of high loads of domestic waste and wastewater.



One drainage pipe pours water in the river  
1200 m from the Barada Spring, Zabadani Area, Feb 2008



A branch of the river and seemed completely dry, which  
accumulate dirt, Sep 2007

## Water Pollution in the Barada River Basin

The discharge of high loads of industrial waste and wastewater.



Polluted water in the tanneries area  
Mar 2008



Polluted water in the Marble Factories area  
Mar 2008



## Water Pollution in the Barada River Basin

Excessive and irregular using of fertilizer and pesticides by farmers.

Using wastewater for irrigation.



Al Ghouta  
Mar 2008



Barada Valley  
Feb 2008



## Water Pollution in the Barada River Basin

The drawing of water from Barada and Fijeh springs for Damascus drinking water supply, by many wells has been digging by government around the springs, in addition to many illegal wells belonged farmers, house owners, factories and touristic establishments, caused drying of the Barada spring lake,



Barada Spring lake, the lake is fully dry, Feb 2008



Al Fijeh Spring  
Feb 2008



Water Pollution in The Barada River Basin



INECO

Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

Institutional and Economic Instruments for Sustainable Water Management in the Mediterranean Region



## Water Pollution in the Barada River Basin

Water Pollution in The Barada River Basin





# Indicators Relevant to the Problem

## Water Quantity

Drought lakes formed by these springs, and that's creating agricultural, environmental, tourism problems in addition to depletion of underground water around basin.

The river drying pushes some farmers to break the sewage network pipes and irrigate their lands with wastewater, that's led to many other problem with the agriculture producing, environmental problems and pollution of groundwater.

The main activities of the people in Barada Basin (Damascus countryside) are agriculture and touristic activities, the losing of their water resources pushes them to migration from the countryside to Damascus city, thereby reducing the green areas and increasing demand for drinking water and other services in Damascus City.



Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

# Indicators Relevant to the Problem

## Water Quantity

The unfair uses of water resources cause the dry of land, and the degradation of soil quality in many areas due to erosion, which reduced the fertility and productivity, which led to the destruction of vegetation and green spaces and forest degradation, and thus decline in biodiversity of land and water in fresh vegetable and animal assets.

Digging illegal wells randomly, affects ecologically a quantity of water levels in groundwater where this will lead to a decrease in the amount of water, declining water quality and pollution.

In many areas, the river bed turning to area for waste disposal due to drought, which led to the spread of insects and pollution of these areas.



Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

# Indicators Relevant to the Problem

## Water Quality

Water pollution in Barada River from sewage water: BOD concentration exceeded the permissible limits in most branches of Barada River, especially in the basement part, where it reached 130 mg/l. Also the Ammonium concentration increased, it reached more than 13 mg/l because of sewage effluent and a decline in the flow of the river.

Increasing in the amount of Nitrates in some wells in Damascus countryside and their concentrations become higher than the permitted level for drinking water. Thus, this led to stop in 2005 the investment of more than 200 wells for drinking in several regions of Ghouta, where the concentrations of Nitrates reached 100-200 mg/l.



# Indicators Relevant to the Problem

## Water Quality

The increasing use of surface water and groundwater in the industry in the area studied reduced the quantities and quality of water for agriculture, which lead to further depletion of groundwater and lead to incompetence of water

Food industries contribute to increasing the burden of organic pollution, which requires oxidation analysed by the dissolved oxygen depletion in the water, which leads to destroy the aquatic life.

The marble factories, led to a decline in water quality. The high concentration of plankton cause turbidity of water and limit penetration of light, and that's stop the vital process.

# Indicators Relevant to the Problem

## Water Quality

The outcome of the review of industries located in the region, found that the statute of the environmental impact of these factories are concentrated primarily in the contamination of both surface and underground water sources, and deteriorating water quality in the absence of sewerage systems and treatment plants, which led to an acceleration of scarcity and lack of water resources, where disposal of industrial wastewater in the region without being subjected to any controls, and acted directly to the Barada River and to the public sewer system without resorting to any form of primary treatment, or are remnants of water drainage and industrial installations directly to the lands.

# Water Sector

The Ministry of Irrigation and its directorates are responsible for administrating developing water resources, regular monitoring of surface and ground water quality and ensuring the availability of water resources for irrigation purposes. The ministry of irrigation is also responsible for controlling drilled wells, and for licensing future wells.

The Ministry of Agriculture and Agrarian reform is responsible for the economic uses of water for agriculture purposes. This include the provision of modern techniques for water savings, and cultivating crops with lower water demands.

The Ministry of Housing and Utilities is responsible for the drinking water distribution networks in urban and rural areas and for domestic waste water treatment.

The Ministry of Local Administration and Environment is responsible for monitoring and controlling water quality, and for issuing national standards for the protection of water resources.



Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008



## Overview of the Institutional and Economic Settings in Syria

Governorates play an important role as offering services, especially for small local authorities, which do not have the necessary technical competence of their own. In each Governorate there is a water authority, which carries out water services in the whole governorate. Public companies under these authorities have been set up in cities, which have wastewater treatment plants. The number of these companies is increasing in line with the increase of the number of treatment plants.

The previous 4 ministries with ministry of health involved in carrying out chemical and biological analysis of ground and surface water resources in favor of the interest of these ministries.

## Overview of the institutional and economic settings in Syria

### The Tariff system:

Sector	2001 – 2007		1/11/2007		Sewage Rate as % from water tariff	Sewage Minimum and Maximum Tariff (S.P.)
	Previous Water Consumption Layer (m <sup>3</sup> )	Previous Tariff Rate S.P./m <sup>3</sup>	Consumed water (m <sup>3</sup> )	Tariff S.P./m <sup>3</sup>		
Household	1-20	3= (0.04E)	1-15	2.5=(0.03E)	5%	Min. 30=(0.42E) Max. 530 = (7.46E)
Household	21-30	4.5= (0.06E)	16-25	7=(0.09E)	10%	
Household	31-60	13.5=(0.19E)	26 – 40	15=(0.21E)	15%	
Household	Over 60	19=(0.26E)	41-60	22=(0.3E)	20%	
Household			Over 61	30=(0.42E)		
Governmental agencies		8.5=(0.11E)		14=(0.19E)	55%	Min. 38=(0.53E) Max. Unlimited
Industrial, commercial and tourism sectors		22=(0.3 E)		30=(0.42E)	40%	Min. 38 (0.53E) Max. Unlimited

## Overview of the Institutional and Economic Settings in Syria

For Domestic Sector, and according to “Damascus City Water Establishment”, the contributions of billing system cover 90% of operating costs. For Damascus countryside the numbers is around 40% of operating costs.

The cost of cubic metre of waste water processor is about 9 LS/m<sup>3</sup> (0.12 Euro).

Funding is obtained (the difference) from the public debt fund (Ministry of Finance).

## Overview of the Institutional and Economic Settings in Syria

For agriculture sector, the revenues are very limited; the farmers should pay a fix amount of money for each hectare every year, with disregarding to the kind of crops.

But in practice that's not happened, the farmers used to bring water from the river or from their own wells without pay anything, and the water price does not include in the agriculture products.

The role of beneficiary associations is completely absent,

The new water law focus in activation of this role, but that still not apply. The Water Users Associations are the ideal instrument to participate in the management of irrigation and water sector.



## Overview of the Institutional and Economic Settings in Syria

For legal industry establishments, they should pay 30 S.P. for each m<sup>3</sup>, and 40% of their total bill for wastewater treatment.

Many illegal industrial workshops in the basin, most of them are using water from the household network and pay only the minimum tariff, and some of them use the river water.

According to the industry wastewater, nothing can recover the cost. The main wastewater treatment plant in Adra City, is just ready to deal with household wastewater, not industrial wastewater. For many times the work of this plant stop completely because the waste and wastewater of industry.

Also, there no distinction between the type or method of industries. i.e. Coca-Cola factories, cement...

## Other Water Management Problems

Lack of integration of functions between authorities.

Deficient application of economic instruments.

Lack of efficient monitoring systems.

Negligence of the role of beneficiaries in water management

Multiplicity of authorities and overlaps in the allocation of responsibilities among the different parties.

Lack of communication and data exchange between policy and decision makers.

Failure of the present policy to achieve capacity building in the water sector.



Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

## Stakeholders

### **Ministries and Governorates Authorities:**

Ministry of Irrigation, Ministry of Agriculture, Ministry of Housing, Ministry of Local Administration and Environment, Ministry of Industry, Ministry of Tourism, Ministry of Finance, State Planning Commission, Ministry of Health.

Damascus Governorate, Damascus Countryside Governorate.

### **Other Scientific Bodies:**

General Board for Water Resources (New), Higher Institute for Water Management (New), Atomic Energy Commission of Syria, Supreme Council of Sciences.

### **NGO's:**

Syrian Environment Association, Damascus Friends Association, Sustainable Development Association, Women Union.

### **Beneficiaries:**

Farmers, Industries, Chambers of Commerce, Industries and Tourism, Mayors of Municipalities.



Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

# List of New Laws Related to Water Sector

Reference	Content	Implementation Status
<p><b>Establishment of the Higher Institute for Water Management</b>  <b>Legislative decree No. 27 for the year 2007.</b>  <b>Dated: 13/4/2007</b></p>	<p>The tasks of HIWM:</p> <ul style="list-style-type: none"> <li>• Undertaking research and scientific experiments,</li> <li>• Designing and implementing training programs.</li> <li>• Reforming technical resources in the ministries involved in water management.</li> <li>• Providing of technical and scientific assistance.</li> <li>• Cooperating with local, Arab and foreign societies for water-related research and studies, training, post-graduate studies and exchange of information and experience.</li> <li>• Providing PhD studies and degrees in the field of water management.</li> </ul>	<p>New decree,  HIWM is currently being launched.</p>
<p><b>Water legislation Law No. 31 for the year 2005.</b>  <b>Dated: 16/11/2005</b></p>	<ul style="list-style-type: none"> <li>• Definition and <u>arrangement of all rights on water resources.</u></li> <li>• Regulation of the <u>use of State water networks and infrastructure.</u></li> <li>• Procedures for the <u>licensing of well</u> and borehole drilling and the exploitation of pumping equipment.</li> <li>• <u>Penalties for destruction, sabotage, dissents and water theft.</u></li> <li>• Implementation of water police (a committee for identifying law offences).</li> <li>• Organisation of water assessments and surveys by the State.</li> <li>• Establishment of <u>Water Users Associations.</u></li> </ul>	<p>It is considered comprehensive, but not fully effected because the Government granted a "grace" period to industries and the owners of illegal wells and boreholes to comply with the law.</p>

# List of New Laws Related to Water Sector

Reference	Content	Implementation Status
<p><b>Establishment of the “General Board for Water Resources”</b>  <b>Legislative decree No. 90 for the year 2005</b>  <b>Dated: 29/9/2005</b></p>	<ul style="list-style-type: none"> <li>• Management, development and protection of water resources in all river basins of the Syria.</li> <li>• Supervision of investments and control of water resources and water infrastructure in all river basins.</li> <li>• Formulation of strategies for executing the adopted water policy, for ensuring the comprehensive and sustainable development of water resources.</li> <li>• Identification of ways of further exploiting water resources, under the coordination of specialized Ministries and other institutions.</li> <li>• Formulation of mechanisms and options for exploiting water resources in a way that protects all river basins, with the coordination/collaboration with other, relevant Minis-tries.</li> <li>• Exploitation, maintenance and development of projects and water infrastructure, definition of standards for assessments, implementation and supervision of commissioning and operation of facilities.</li> <li>• Training and education of technical staff within and outside the country, in cooperation and coordination with various scientific boards to achieve the targets of the HIWM.</li> <li>• Proposal of relevant legislation needed for the implementation of HIWM tasks, etc.</li> </ul>	
<p><b>The Environment Law No. 50 for the year 2003.</b></p>	<ul style="list-style-type: none"> <li>• Identified the standards and the maximum limits of Pollution Parameters for discharge in the water environment</li> </ul>	



## Current Efforts for Improve Water Management

The Syrian government is working on several important projects in order to improve the water quality of Barada Basin

The new legislation requires that tanning manufactures move from the river vicinity to the new industrial area of Adra (in northern Damascus). But...

Discussion is going on to find a good incentives to move many workshops and factories to the Adra Industrial City.

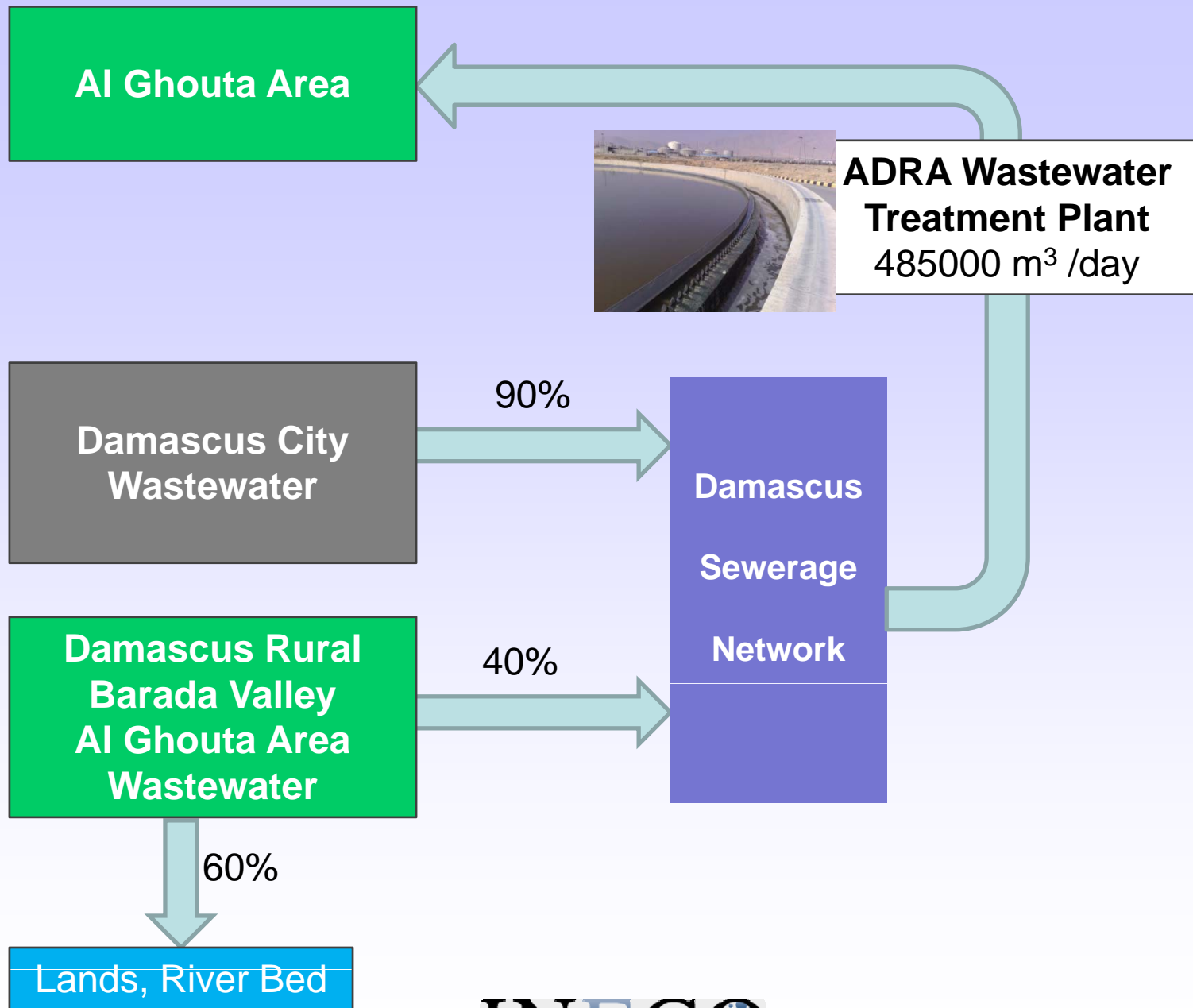
The State, with support from different International Agencies has undertaken a good initiative for monitoring water resources in the region, (Surface and groundwater quality), a good database for automatic water analysis is launched under the responsibility of Ministry of Irrigation.

A plan to develop Adra wastewater treatment plant in order to make it ready to deal with industrial wastewater, and improve the out of this treatment plant..



Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

Water Pollution in The Barada River Basin



## Currently Applied Institutional and Economic Instruments

A program for construction 30 small wastewater treatment plants in Damascus rural (around the river basin), in order to assure a clean flow of the water in the riverbed and treat all the wastewater before arriving to the river.

The government took decisions to push the farmers to use the modern technologies for irrigation.

Non-interest loan for the farmers to move into modern irrigation technologies.

The Environmental Law and Water Law are very important steps to draw the legal framework for all other efforts.

The new water tariff is also good step to push people to save water.

The government try to activate the Water Users Associations, the new water law open the road to establish such associations but till now there role is completely absent.

The 10<sup>th</sup> five years plan (2006-2010) draw a good short and long term road map to achieve IWRM.



Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

## Currently Applied Institutional and Economic Instruments

The Establishment of the “Higher Institute for Water Management” is a very important step in order to undertaking research and scientific experiments, designing and implementing training programs, reforming technical resources in the ministries involved in water management, providing of technical and scientific assistance, post-graduate studies and exchange of information and experiences. Providing PhD studies and degrees in the field of water management.

Many awareness campaigns had took place in order to increase the awareness of farmers for many subjects, such as: modern irrigation methods, the dangers of using polluted water, nitrates effects, the excessive application of fertilizers and pesticides...



Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008



مشروع تطوير تقانات الري الفعالة والإرشاد في سورية

الجمهورية العربية السورية  
وزارة الزراعة والإصلاح الزراعي  
مديرية الإرشاد الزراعي

2

نهاية الموسم 2

ري تقليدي

بداية الموسم

حديث

## فوائد أنظمة الري الحديثة

الري الحديث

الري التقليدي



تقنيات الري الفعالة  
في سوريا  
JICA Project on Develo  
Technique and Ext

أخي المزارع	أخي المزارع	أخي المزارع
<p>أن من أهم وسائل العلاج ما يلي:</p> <ul style="list-style-type: none"> <li>- ترشيد استخدام الأسمدة الكيماوية من حيث نوعية وطريقة الإضافة.</li> <li>- ترشيد استخدام المياه لمنع الرشح في المياه الجوفية.</li> <li>- مراعاة محتوى التربة في التربة والبيات والمبار.</li> <li>- تشجيع استخدام الأسمدة العضوية.</li> </ul>	<p>أن من أهم وسائل العلاج ما يلي:</p> <ul style="list-style-type: none"> <li>- ترشيد استخدام الأسمدة الكيماوية من حيث نوعية وطريقة الإضافة.</li> <li>- ترشيد استخدام المياه لمنع الرشح في المياه الجوفية.</li> <li>- مراعاة محتوى التربة في التربة والبيات والمبار.</li> <li>- تشجيع استخدام الأسمدة العضوية.</li> </ul>	<p>أن من أهم وسائل العلاج ما يلي:</p> <ul style="list-style-type: none"> <li>- ترشيد استخدام الأسمدة الكيماوية من حيث نوعية وطريقة الإضافة.</li> <li>- ترشيد استخدام المياه لمنع الرشح في المياه الجوفية.</li> <li>- مراعاة محتوى التربة في التربة والبيات والمبار.</li> <li>- تشجيع استخدام الأسمدة العضوية.</li> </ul>
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## INECO Participatory process and outcomes

The INECO Workshop in Syria was held at September 10<sup>th</sup> 2007 with 54 participants from various ministerial departments, governmental agencies, regional authorities and NGOs.

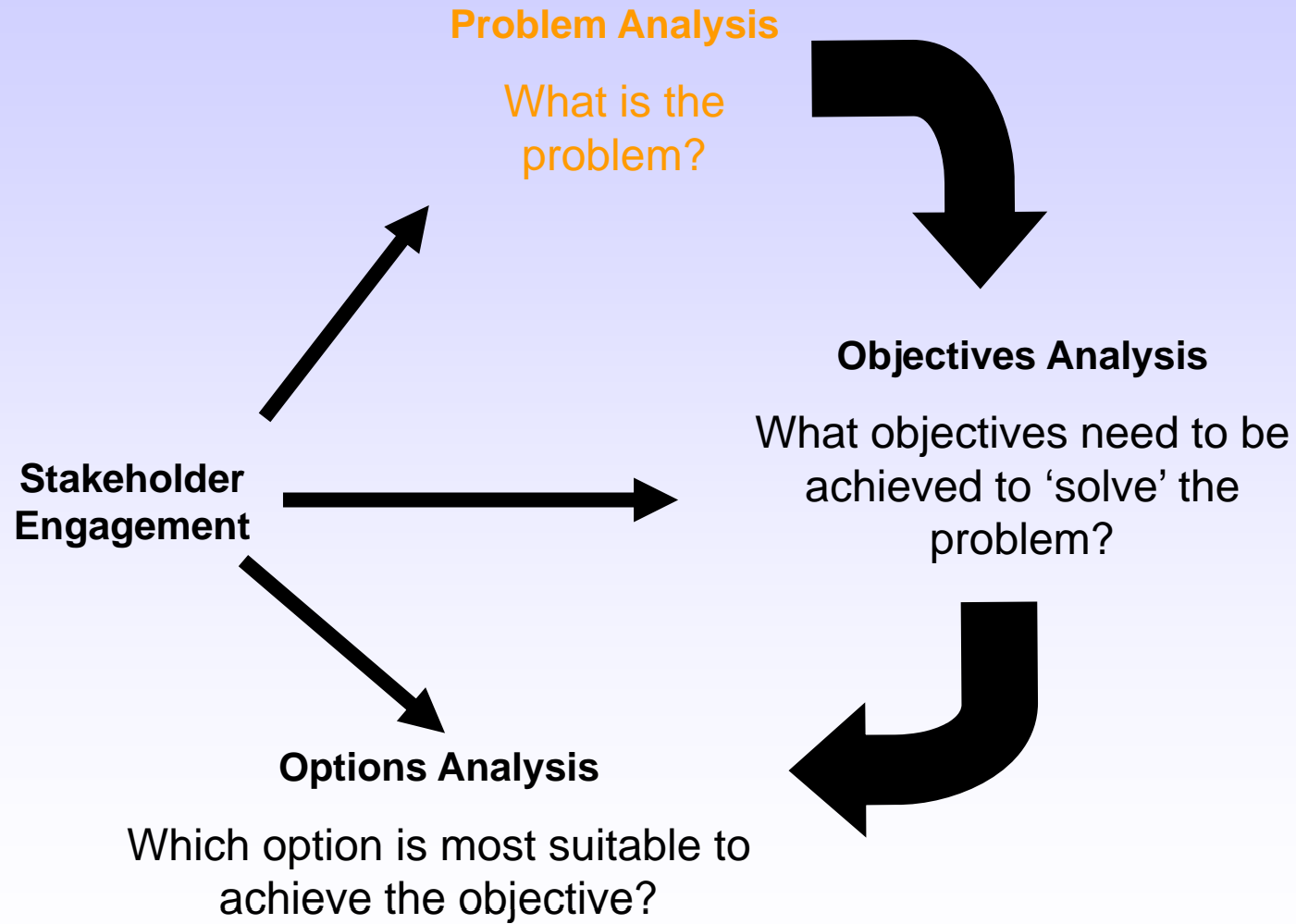
The workshop aimed at strengthening the alliance between the INECO Project Team and Local Stakeholders, by providing a platform for constructively engaged dialogue on the mitigation of water pollution of the Barada River.



INECO

Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

# Problem – Objectives – Options Analysis





# The analysis of the problem in the INECO Workshop

Water Pollution in the Barada River Basin

**Water pollution from household, industrial wastewater and agriculture drainage in the Barada Basin**

Higher costs for the production of safe water (for drink and agriculture)  
 Need for expensive pre-treatment  
 Groundwater contamination

Higher direct and indirect cost due to impacts on human health

Drop in real state values

Lower income from tourism

Use of untreated wastewater for irrigation

Increased illness and morality

Deterioration of life quality

Poor water quality

Loss of valuable biodiversity

Excessive and irregular application for fertilizer and pesticides

Disposal of sewerage water to permanent and/or temporary water channels

Unauthorized discharge of sewage and untreated wastewater in the land near populated areas

Poorly maintained sewerage network-significant leakage ratio

Disregarding of environmental issues

Lack of adequate facilities for water sanitation and wastewater collection and treatment

Large-scale uncontrolled discharge from industrial activities (fertilizers, food industry, tanneries)

Limited financial and technical capacity of water and wastewater authorities

Absence of an integrated policy for environmental management

Unplanned urban expansion in areas not served by sewerage system

Low share of population connected to wastewater treatment plants in the rural areas

Lack of efficient monitoring system

Fees not always harmonious with the using of the water (i.e.: water demand industries)

Limited application of sewerage and wastewater treatment charges

Lack of private sector investment in water treatment subject

Rapid Population Growth 2.4% yearly

Lack of NGO's role in the decisions making and monitoring system

Centralized management and limited responsibility of local authorities

Inadequate law enforcement

Water services are subsidizes within the contents of the overall social policy

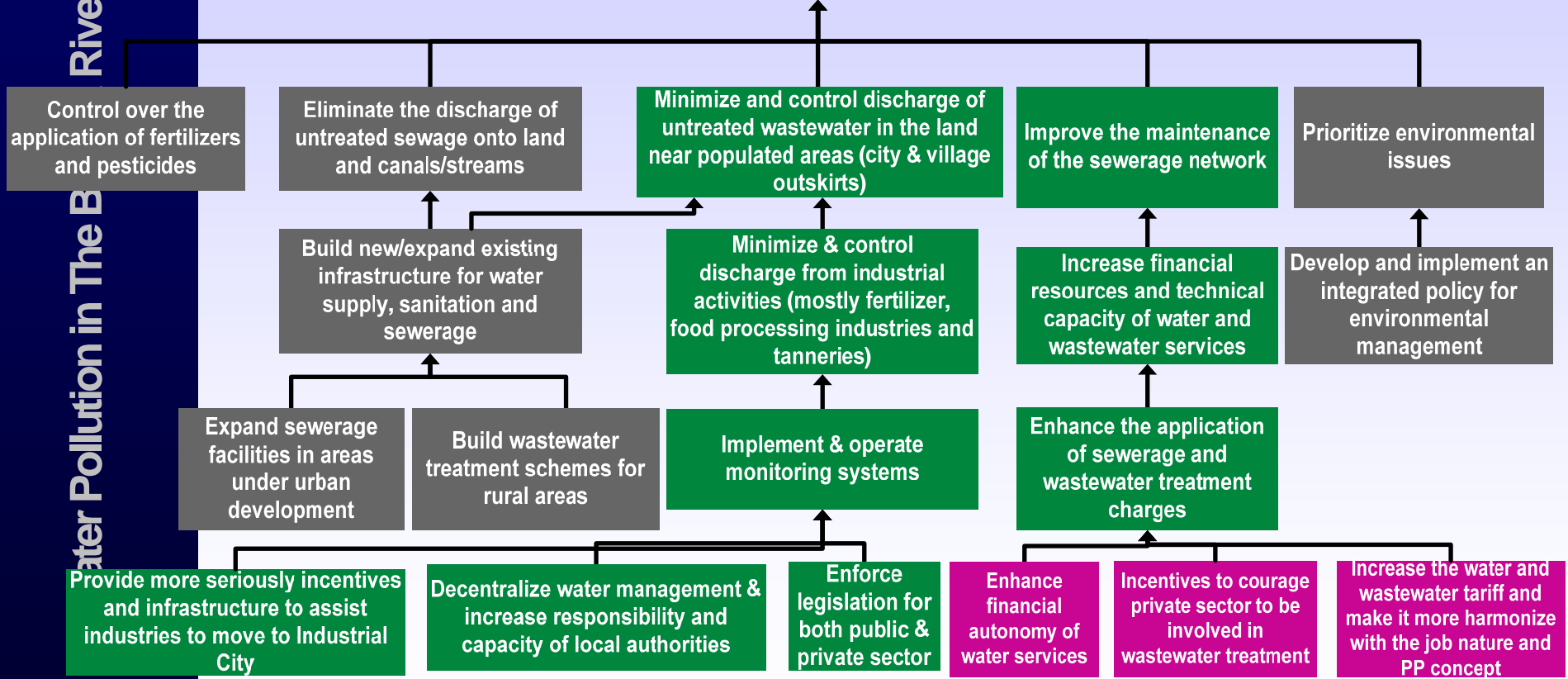
Legend	
Causes	Effects
Valuing	Environmental
Governing	Socioeconomic
Other	

# The objectives and suggested options defined in collaboration with local stakeholders

River Basin

Water Pollution in The B

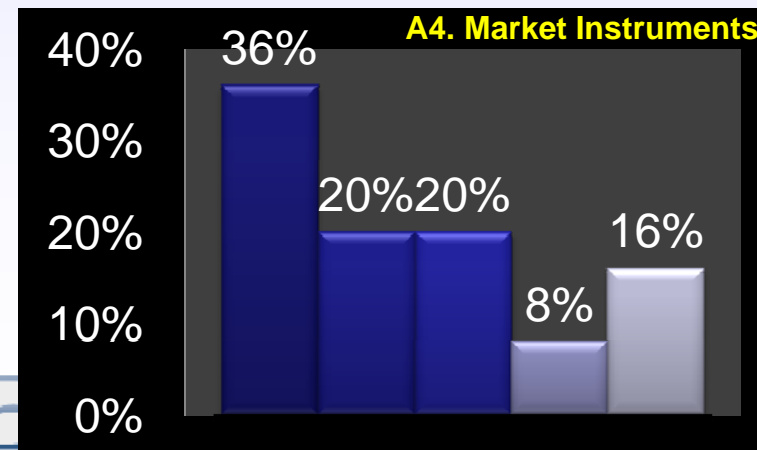
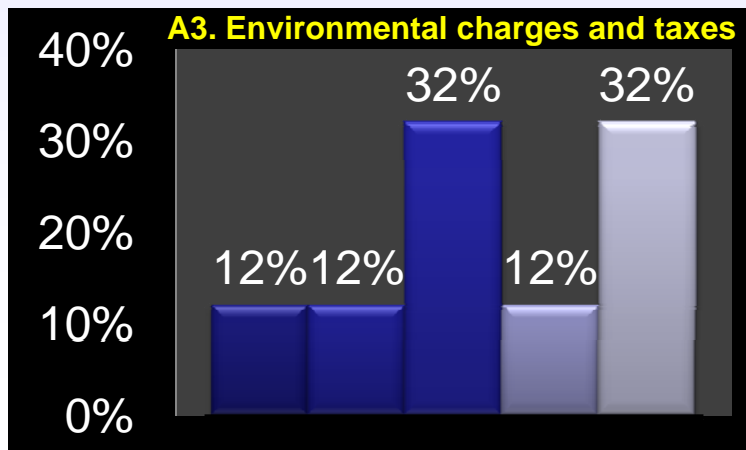
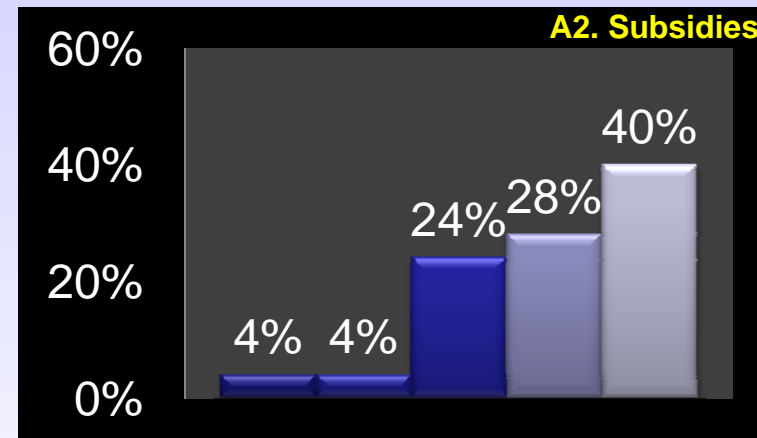
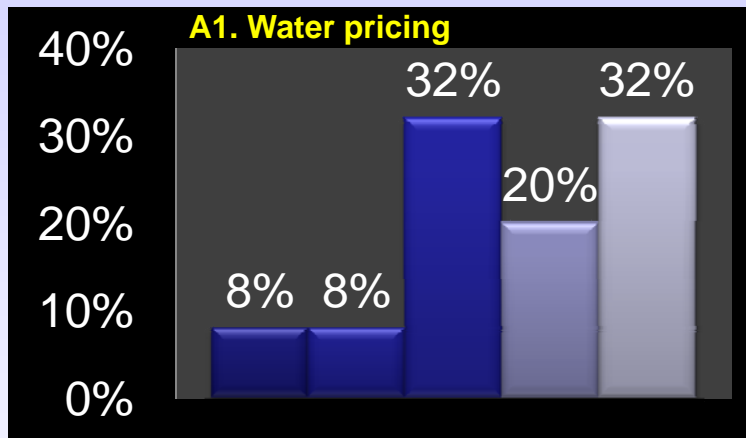
## Minimize Water Pollution in the Barada River Basin



Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

## The Evaluation of Options by Stakeholders and their comments/additional suggestions

I. Which of the proposed “instruments or approaches” is in your opinion more preferable? (1 least preferable, 5 most preferable)

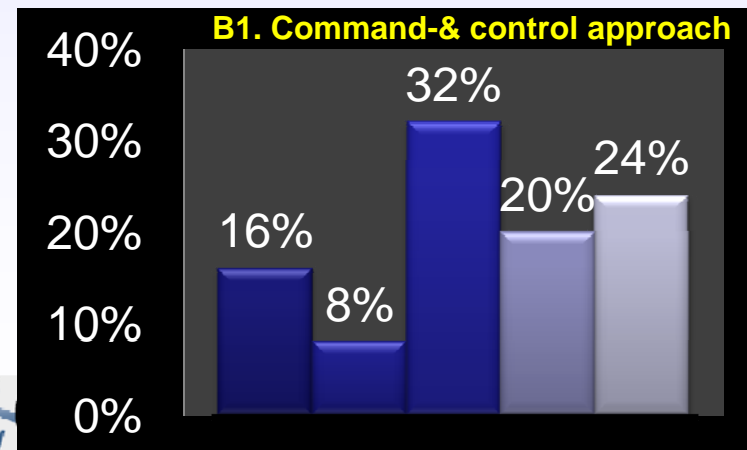
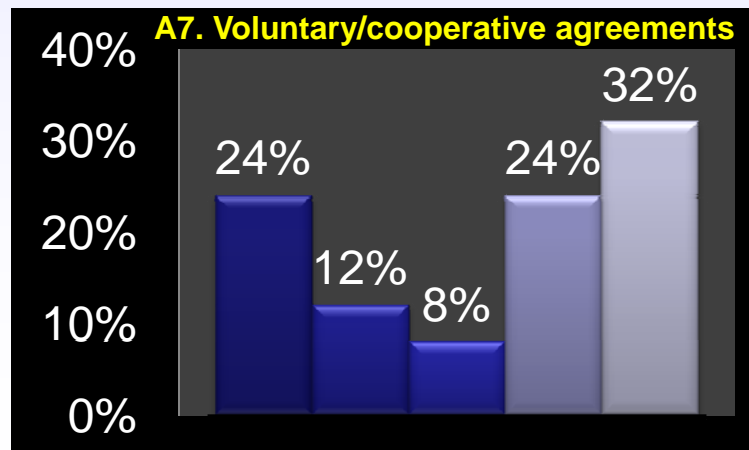
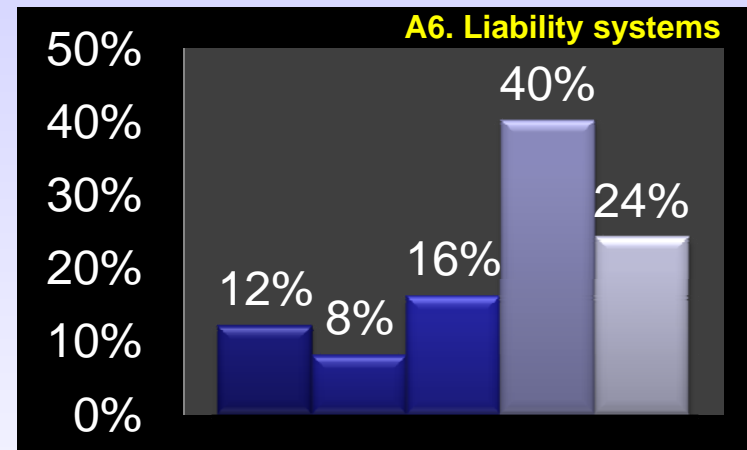
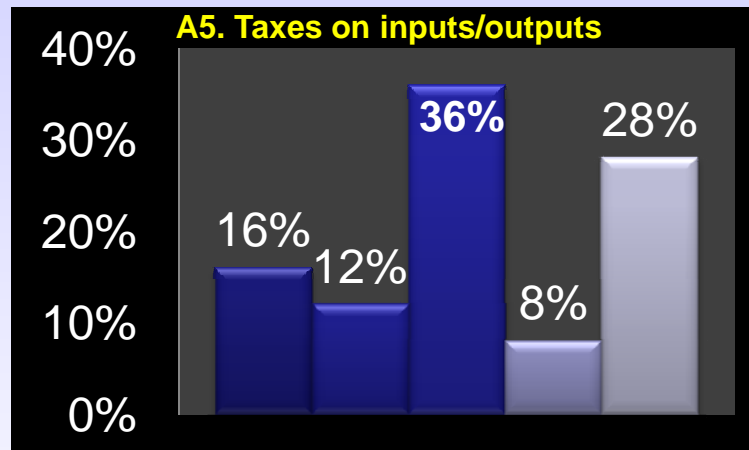


Tunis 15<sup>th</sup> - 16<sup>th</sup> July 2008



## The Evaluation of Options by Stakeholders and their comments/additional suggestions

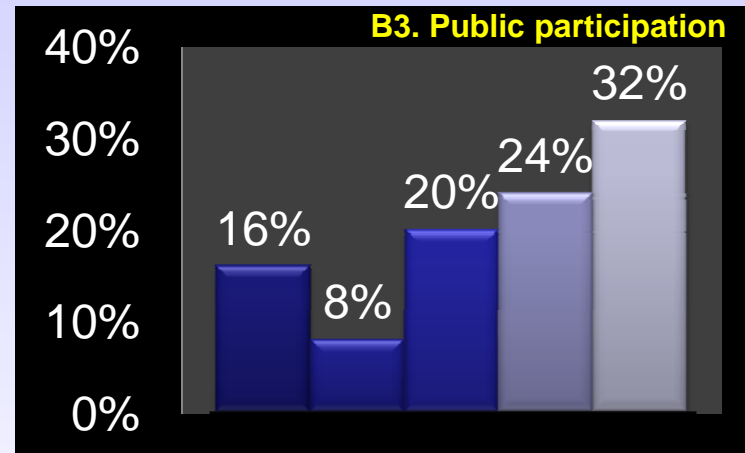
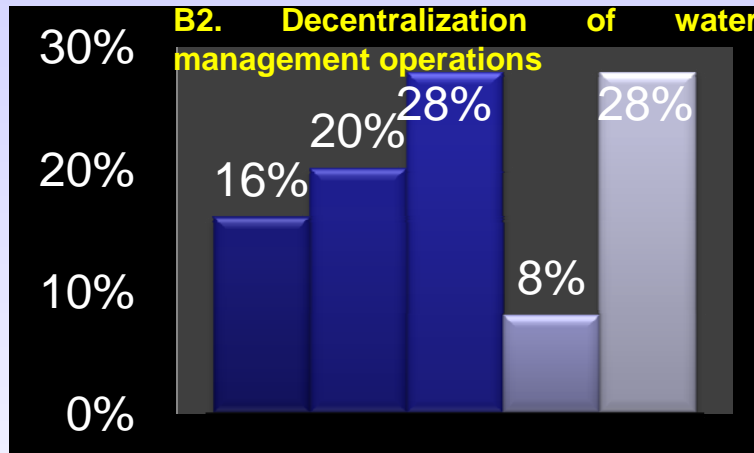
I. Which of the proposed “instruments or approaches” is in your opinion more preferable? (1 least preferable, 5 most preferable)



Tunis 15<sup>th</sup> - 16<sup>th</sup> July 2008

## The Evaluation of Options by Stakeholders and their comments/additional suggestions

I. Which of the proposed “instruments or approaches” is in your opinion more preferable? (1 least preferable, 5 most preferable)



Results:



- A2. Subsidies
- B3. Public Participations
- A7. Voluntary/cooperative agreements
- A1. Water Pricing
- A3. Environmental charges and taxes
- A5. Taxes on inputs/outputs
- B2. Decentralization of water management operations
- A6. Liability systems
- B1. Command-& control approach
- A4. Market Instruments

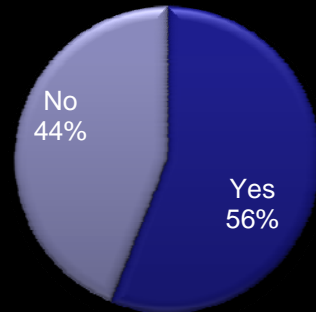
INECO

Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

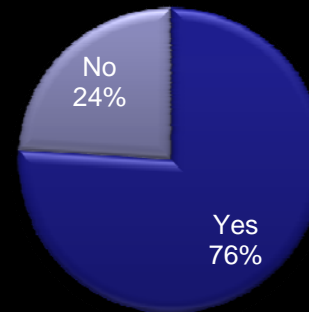
## The Evaluation of Options by Stakeholders and their comments/additional suggestions

II. Which or how many of the attached “options” are more relevant or feasible for the immediate challenges and opportunities

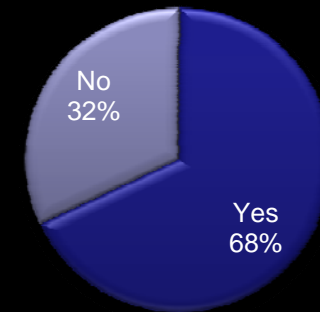
**A1. Water pricing**



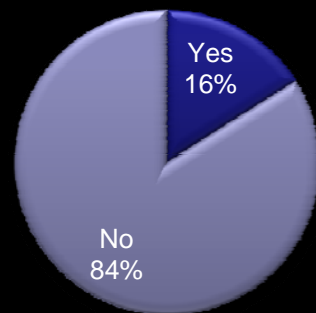
**A2. Subsidies**



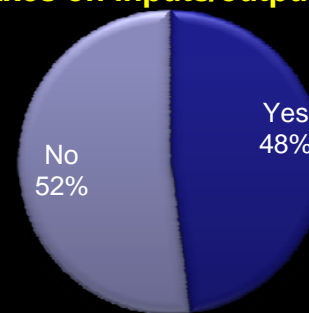
**A3. Environmental charges and taxes**



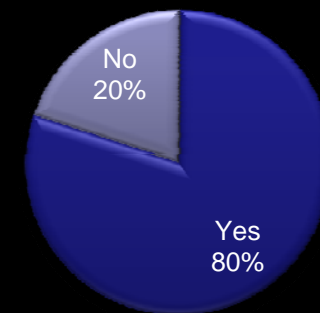
**A4. Market Instruments**



**A5. Taxes on inputs/outputs**

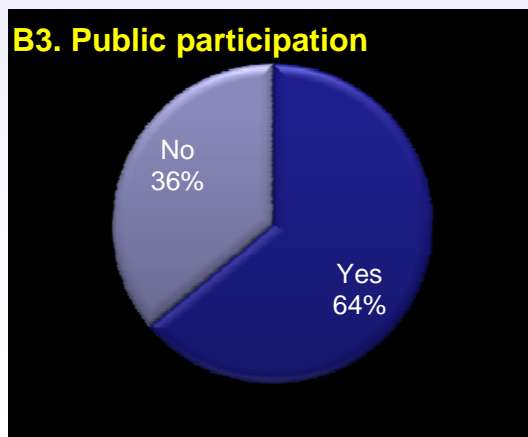
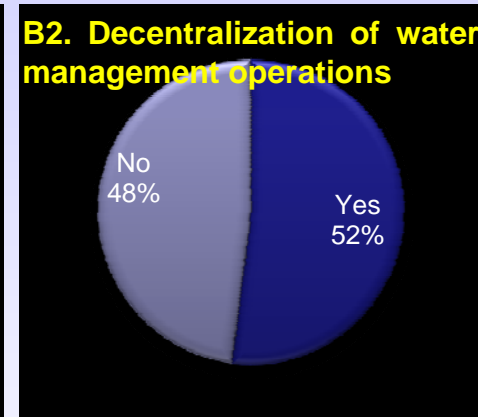
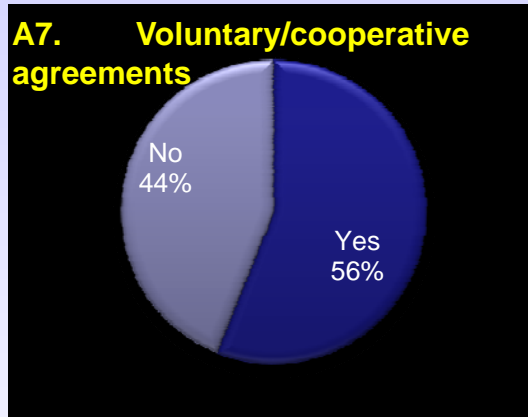


**A6. Liability systems**



## The Evaluation of Options by Stakeholders and their comments/additional suggestions

II. Which or how many of the attached “options” are more relevant or feasible for the immediate challenges and opportunities



### Results



- A6. Liability Systems
- A2. Subsidies
- A3. Environmental charges and taxes
- B1. Command-& control approach
- B3. Public Participations
- A1. Water Pricing.
- A7. Voluntary/cooperative agreements
- B2. Decentralization of water management operations
- A5. Taxes on inputs/outputs
- A4. Market Instruments

INECO

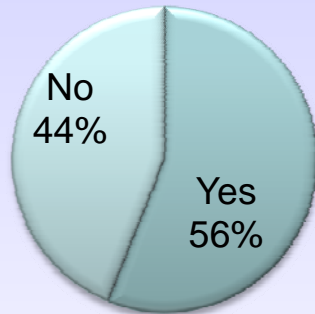
Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008



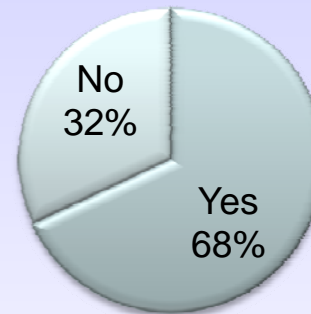
## The Evaluation of Options by Stakeholders and their comments/additional suggestions

III. Do you believe that any of the listed “options” are “relevant” to water pollution in the Barada River Basin? Please check using an X those you feel that are relevant now.

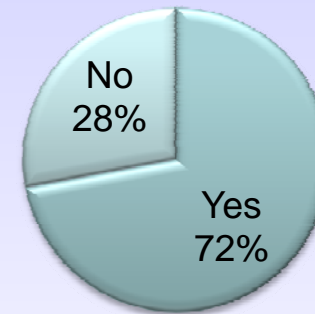
A1. Water pricing



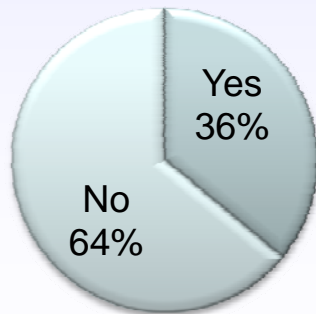
A2. Subsidies



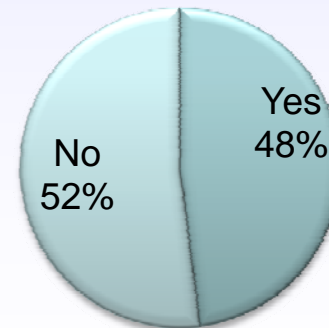
A3. Environmental charges and taxes



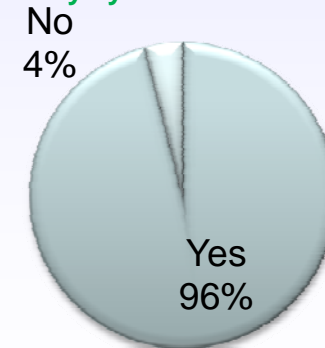
A4. Market Instruments



A5. Taxes on inputs/outputs



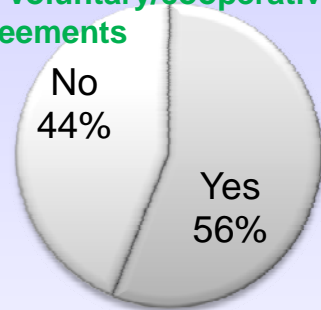
A6. Liability systems



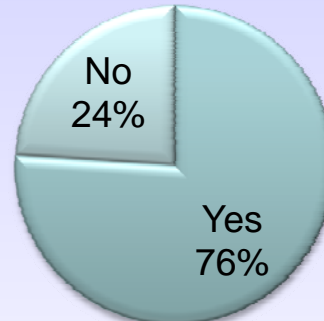
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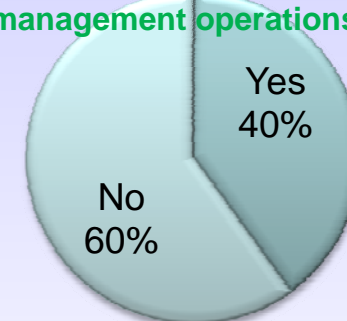
A7. Voluntary/cooperative agreements



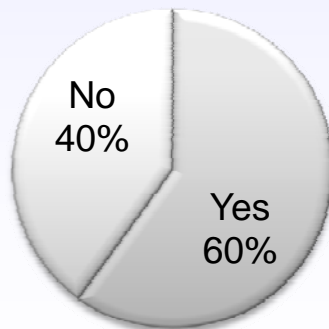
B1. Command-& control approach



B2. Decentralization of water management operations



B3. Public participation



**Results:**

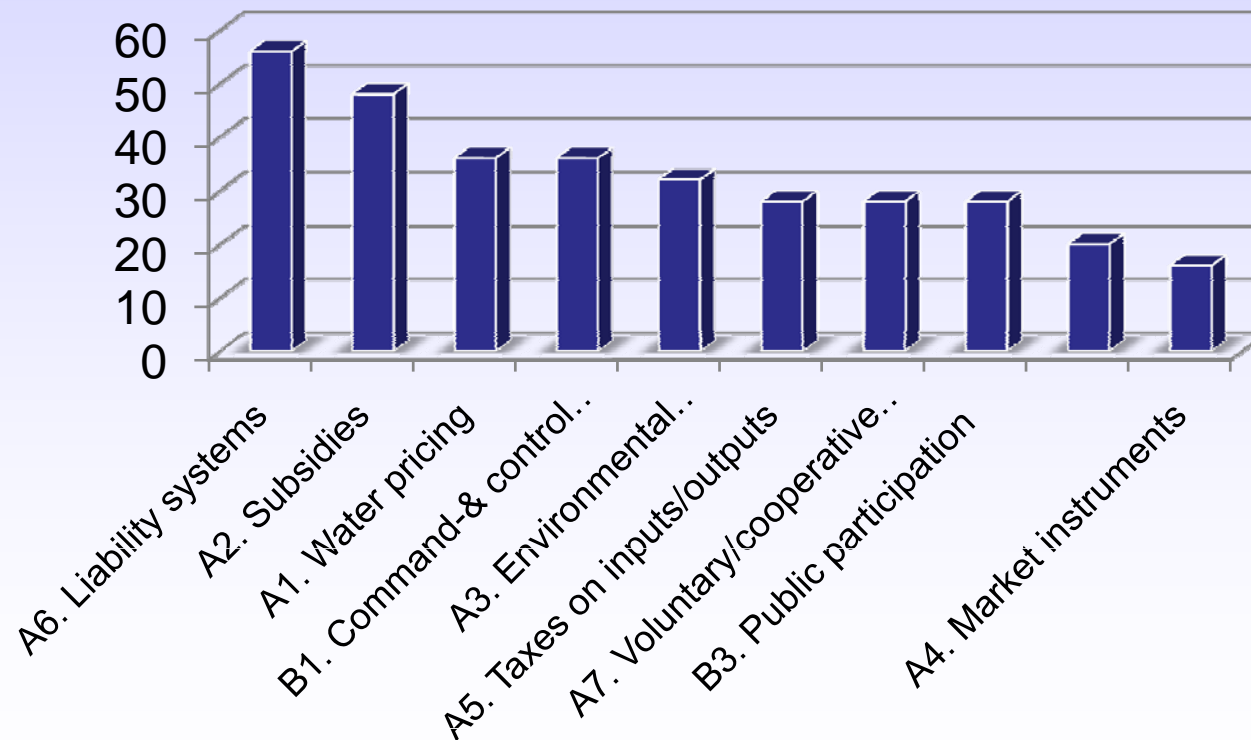
- A6. Liability Systems
- B1. Command-& control approach
- A3. Environmental charges and taxes
- A2. Subsidies
- B3. Public Participations
- A1. Water pricing
- A7. Voluntary/cooperative agreements
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- B2. Decentralization of water management operations
- A4. Market Instruments



Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

## The Evaluation of Options by Stakeholders and their comments/additional suggestions

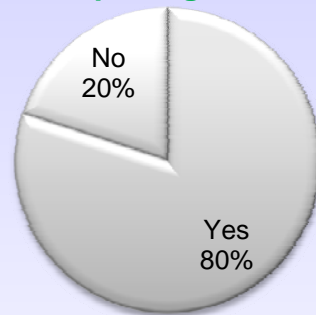
IV. Please grade using a scale from 1 to 5 (1 most urgent, 5 least urgent) any option that you think is more appropriate for your situation.



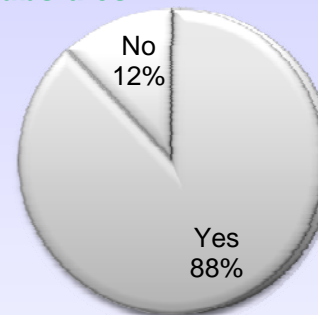
## The Evaluation of Options by Stakeholders and their comments/additional suggestions

V. Looking in a broader manner, as to Syria as a whole, check any options that pertain to the future of your country.

A1. Water pricing



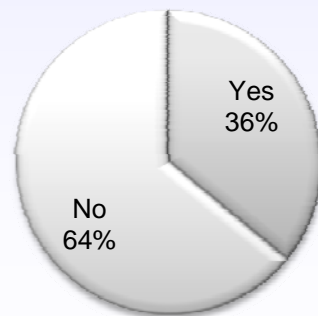
A2. Subsidies



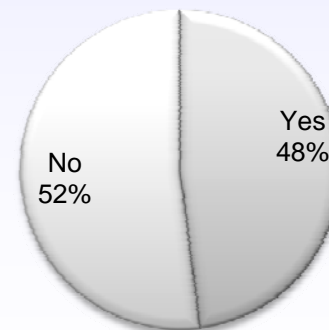
A3. Environmental charges  
and taxes



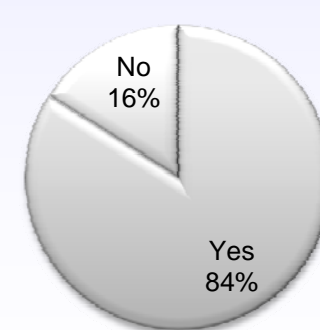
A4. Market Instruments



A5. Taxes on inputs/outputs



A6. Liability systems

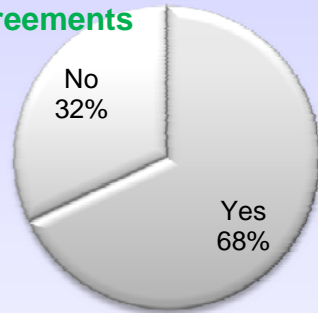




## The Evaluation of Options by Stakeholders and their comments/additional suggestions

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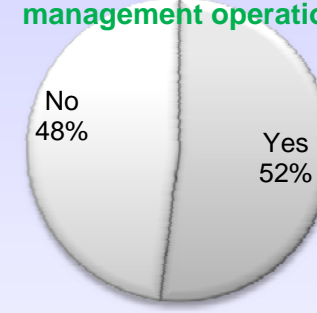
**A7. Voluntary/cooperative agreements**



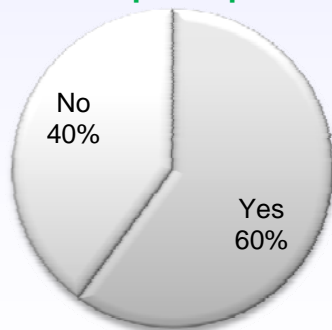
**B1. Command-& control approach**




**B2. Decentralization of water management operations**



**B3. Public participation**



**Results:**

- 
- A2. Subsidies
  - A6. Liability Systems
  - A1. Water Pricing
  - A3. Environmental charges and taxes
  - A7. Voluntary/cooperative agreements
  - B1. Command-& control approach
  - B3. Public participation
  - B2. Decentralization of water management operations
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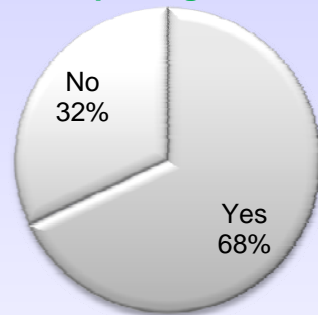


Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

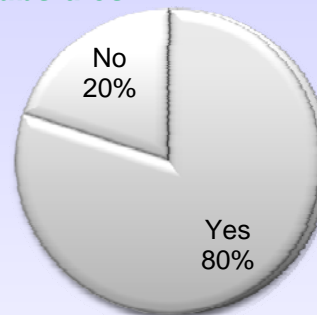
## The Evaluation of Options by Stakeholders and their comments/additional suggestions

VI. Please check those economic and/or institutional options or tools that you consider as reasonable or applicable.

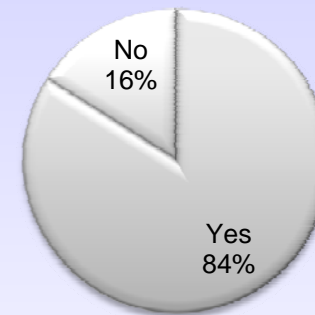
A1. Water pricing



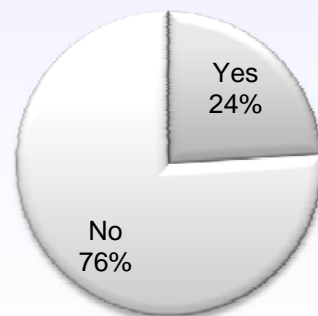
A2. Subsidies



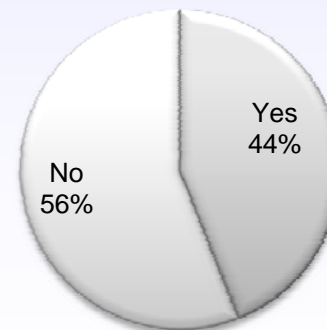
A3. Environmental charges and taxes



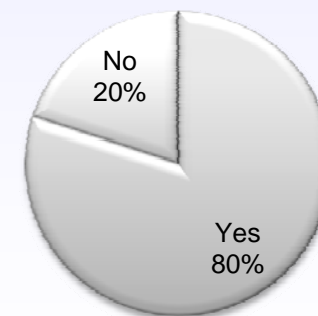
A4. Market Instruments



A5. Taxes on inputs/outputs



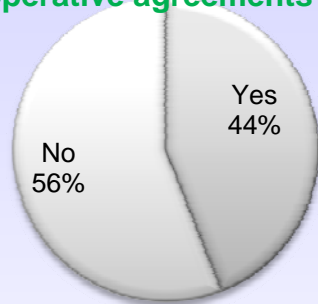
A6. Liability systems



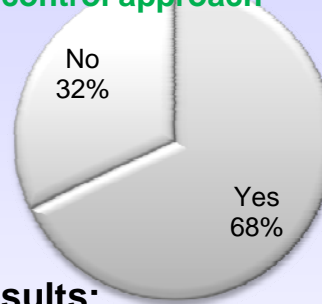
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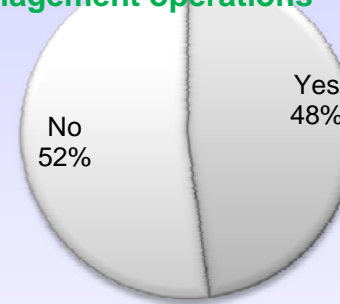
**A7. Voluntary / cooperative agreements**



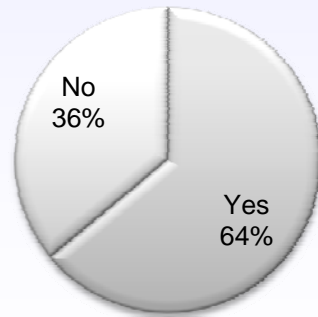
**B1. Command-& control approach**




**B2. Decentralization of water management operations**



**B3. Public participation**



**Results:**

- 
- A3. Environmental charges and taxes
  - A6. Liability Systems
  - A2. Subsidies
  - A1. Water Pricing
  - B1. Command-& control approach
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  - B2. Decentralization of water management operations
  - A5. Taxes on inputs/outputs
  - A7. Voluntary / cooperative agreements
  - A4. Market Instruments

## Analysis of the Results

According to analyzing of stakeholders:

Topic	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3
Instruments more preferable	7	10	6	1	5	3	8	2	4	9
More relevant or feasible for the immediate challenges and opportunities	5	9	8	1	2	10	4	7	3	6
Relevant to water pollution in the Barada River Basin	5	7	8	1	3	10	4	9	2	6
More appropriate for our situation.	8	9	6	1	5	10	4	7	2	3
Options that pertain to the future of Syria	8	10	7	1	2	9	6	5	3	4
Instruments consider as reasonable or applicable	7	8	10	1	3	9	2	6	4	5
<b>Total</b>	<b>40</b>	<b>53</b>	<b>45</b>	<b>6</b>	<b>20</b>	<b>51</b>	<b>28</b>	<b>36</b>	<b>18</b>	<b>33</b>



- A2. Subsidies.
- A6. Liability Systems.
- A3. Environmental charges and taxes.
- A1. Water Pricing.
- B1. Command-& control approach.
- B3. Public Participations.
- A7. Voluntary / cooperative agreements.
- A5. Taxes on inputs/outputs.
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- A4. Market Instruments.



Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008



## Proposals for Improving the Water Management in Barada River Basin

### Subsidies:

To create more incentives to encourage industrials to move to Industrial City.

Assuring water, electricity, and wastewater treatment in good prices in the industrial city.

Encourage businesses to invest in water-efficient equipment to help reduce their water use and improve water quality.

Good incentives for the modern irrigation companies, and find a way to facilitate the technology transfer in this field, in addition to encourage these companies to organize many awareness campaigns in order to assure the knowledge transfer to the farmers.



Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

## Proposals for Improving the Water Management in Barada River Basin

### Liability Systems:

Enforcement the law implementation, for both public and private sector.

Legislation to effectively cut back illegal connections and water theft needs to be adopted.

Implementation of tools like the 'polluter pays' principle and cost recovery schemes - possibly in combination with incentives for environmentally-friendly activities

## Proposals for Improving the Water Management in Barada River Basin

### Environmental charges and taxes:

Improving performance standards in water supply and treatment.

Increasing or decreasing the well licensing cost according to situation of groundwater in the area.

Institutional and legal reform providing more liberty to water and wastewater authorities in establishing tariffs.

## Proposals for Improving the Water Management in Barada River Basin

### Water Pricing:

A more effective pricing system should enable water authorities to recover.

The water prices system should make a good distinction between the agriculture crops and industrial kinds.

## Proposals for Improving the Water Management in Barada River Basin

In addition to implementation of the previous Instruments / Options, we can mention the following:

The key responsibility of the government will be to develop a policy and strategic planning framework for the water sector for the short, medium and long term planning horizons. This will focus on priority areas for intervention and support and address issues such as the role of the private sector, pricing and charging policy, the water value in the agriculture production, in addition to other subjects as remove the overlapping between the different bodies.

Increasing the management efficiency of the people who are in the administrative positions, through training, knowledge transfer, experiences exchange...



## Proposals for Improving the Water Management in Barada River Basin

There is a general need for technical training, introduction of information technology into process control.

Promotion of water conservation measures at households, hotel sector.

Increasing the capacity for projects planning and evaluation (PCM Training).

Restructuring the water institutions in order to move the administration process to the basin level.

Increasing the awareness at the users level, householders, industries and farmers.. About the problem.

Emphasis on the role of Water Users Associations, in order to increase the participatory approach in the decision making procedure.

Developing the water database in the basin, and assuring the transparency of information exchange.



Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

## Other INECO Activities

Many meetings had took place with the stakeholders: Ministry of Irrigation, Ministry of Housing (Damascus City Water Establishment), Ministry of Local Administration and Environment (Water Directorate), Ministry of Agriculture (Agriculture Research Centre), Ministry of Industry, Ministry of Tourism, Damascus Governorate, Damascus Countryside Governorate, Mayors, Farmers, industrialists, NGOs as Syrian Environment Association , Damascus Friends Association, Sustainable Development Association, Women Union...

In order to record the sufferings of this river, the INECO project team visited most of the villages situated along the river bed, and met some farmers and industrialists. He also photographed and make a video movie for many of the contaminated phenomena existing.



Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

## Other INECO Activities

According to the dissemination, the INECO team provide Media with many newspaper articles about the problem, in addition to several TV and Radio interviews.

The INECO project team distributed 1000 bookmark calendar to different bodies with a cartoon photo to explain the problem and invite all to handle their responsibility.

The INECO Project team distributed CD's with a lot of information, photos, presentation about the problem for different bodies.

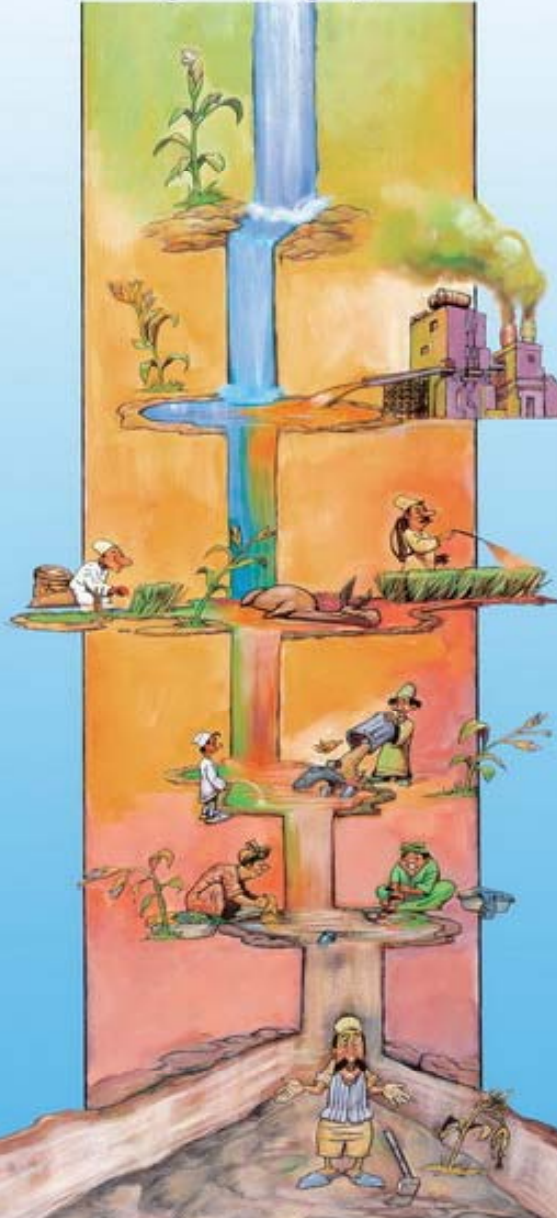


Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

# ١٥ للموارد والمائية



المشكلة من صنع أيدينا وحلها واجب علينا  
الحل يحتاج لمشاركة الجميع



# كيف يرى مشروع ineco حوض بردى مك



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الوضع  
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أن المش  
للوصول  
كما يو  
بقاء...

الرخام، والتي تتمركز بكثافة هي والدباغات في عين قرمبا قرب دمشق...

نحن نريد  
من)، هل هو  
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بالشكثة  
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بالانتقال  
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ليس حراماً  
هذه الجه



من)، هل هو  
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يأتي من  
المرعية  
نسبنا قاص  
بالشكثة  
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الجهات  
مسألة الد  
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عدراً، إلا  
المائي ال  
الصناعة  
المبررات،  
ليس حراماً  
هذه الجه

Water Pollution in The Barada River Basin



INECO

Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008

Institutional and Economic Instruments for Sustainable Water Management in the Mediterranean Region



# Thank you



**Malek Al Haddad**

**INECO**

*Tunis 15<sup>th</sup> – 16<sup>th</sup> July 2008*