



INECO

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

Coordination Action

DELIVERABLE NO 8

TPOLOGY OF INSTITUTIONAL FRAMEWORKS

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Preface

Deliverable 8, “Typology of institutional frameworks”, summarizes the work undertaken in WP 6 of the INECO Project (“Institutional and Economic Instruments for Sustainable Water Management in the Mediterranean Region”, Contract No: INCO-CT2006-517673), on the definition of a typology of the institutional, social and economic conditions in the regions analysed within the framework of INECO.

INECO discusses shared problems in the decision-making process and the deficiencies of the present governance structures around the Mediterranean Basin in Cyprus, Tunisia, Egypt, Lebanon, Syria, Algeria and Morocco. Research focuses on alternative institutional and economic instruments for promoting equity, economic efficiency and environmental sustainability in the sharing, valuing and governing dimensions of water management.

In this context, the typology developed and presented in this document is based on the classification of data, descriptive information, indicators, and responses of local stakeholders to dedicated questionnaires, aimed at identifying perceptions on administrative, financial and governance constraints facing the water sector. As such, this document is a synthesis of regional analyses undertaken in previous stages of the project, on the overall institutional organization of the water sector, policy making mechanisms and issues related to the governing, sharing and valuing dimensions of the water management issues that constitute the focus of the INECO Case Studies.

The Deliverable is structured in four chapters:

- **Chapter 1**, “Introduction”, provides an overview of the premises regarding typology development within the overall INECO approach and methodology.
- **Chapter 2** presents the 1st level typology, the typology of water management problems analysed within the framework of INECO;
- **Chapter 3** presents the 2nd level typology of underlying causes that contribute significantly to the water management issues at hand.
- In conclusion, **Chapter 4** outlines key policy-relevant questions that stem from the seven INECO Case Studies.

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- Aeoliki Ltd (Cyprus);
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- International Consultants (Egypt)
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- Studies and Integration Consulting (Syria);
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1 Introduction

1.1 Typology definition in the context of the INECO research

Typology is commonly defined as “*the systematic classification of the types of something, according to their common characteristics*”. In the context of the INECO research framework, the “typology of institutional frameworks” is perceived as a tool for outlining the (common) institutional, social and economic factors that affect the effectiveness and efficiency of current water management approaches, policies and plans. Thus, the development of a typology can help in the systematic identification of alternative responses to water management issues at hand, and of instruments, corrective actions and changes required to promote sustainable water management and policy integration.

In the above framework, the INECO typology is formulated on two levels (Figure 1). The first level concerns the definition of a typology of the water management issues in order to depict commonalities and differences with regard to the problems themselves and their wider socio-economic and environmental/ecosystemic impacts.

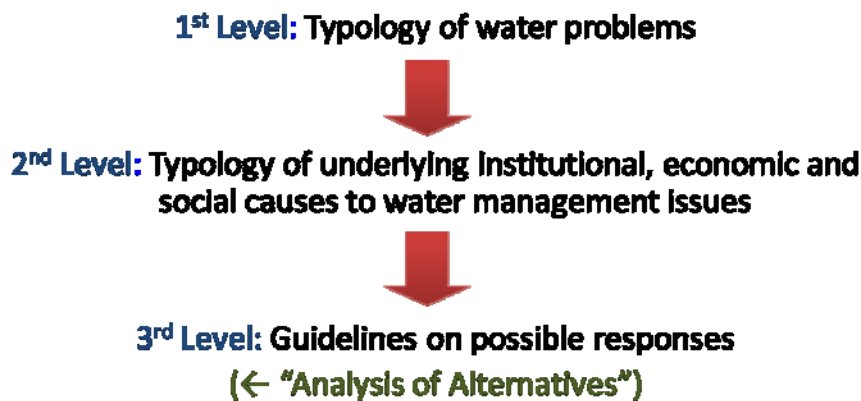


Figure 1: Levels for the formulation of the INECO Typology

The second level typology involves defining underlying causes, deficiencies and constraints that contribute to water management issues perceived as significant in the local and/or national context. Following from the overall INECO conceptualization and problematique, these factors pertain to the three water management challenges that constitute the focus of the INECO approach: Sharing water, Valuing water and Governing water.

Constraints/issues relevant to **water sharing** refer to the mechanisms (institutional, regulatory, legislative, economic) in place for water allocation at the river basin level (between uses), at the service provision level (between users) and at the transnational level. Constraints related to **water valuing** refer to the to the assessment of costs and values in water use, the maximisation of economic efficiency in inter- and intra-sectoral water allocation, the implementation of the cost-recovery principle for supporting sustainable water service delivery, and the implementation of the user-pays and beneficiary-pays principles. **Water governance** refers to mechanisms, issues and constraints that provide the enabling environment for the implementation of IWRM, and that focus on the aspects of:

- Participation of all citizens in the decision-making process, either immediately or through organisations representing their interests;
- Decentralisation and application of the subsidiarity principle;
- Transparency of water-related decisions, especially in relation to water allocation, water service revenue and investment capital allocation, and definition of water charges;
- Equity, ensuring that all citizens are being treated equally and have equal opportunities in water use;
- Accountability, with regard to decisions taken;
- Coherence and integration between policies and goals;
- Responsiveness with regard to changes in demand, supply, development goals or extreme hydrological events.

Following from the above context, the definition of the INECO typology of institutional frameworks was based on the analysis for each Case Study of the elements described in Table 1.

Table 1: Elements analyzed for each of the INECO Case Studies

Conditions	Issues analyzed
Institutional conditions	<ul style="list-style-type: none"> – Organizational framework – Legislation – Regulations
Social conditions	<ul style="list-style-type: none"> – Public participation – Equity – Gender issues
Economic conditions	<ul style="list-style-type: none"> – Implementation of the “polluter-pays” principle – Privatization of water services – Financial sustainability of water services

Depending on the context of each INECO Case Study, the analysis of each element is described in specific (or all if relevant) institutional functions (see also Figure 2):

- **Constitutional function**, focusing on the central organizational structure and the framework for the development of national water policies;
- **Organisational function**, addressing patterns and processes adopted for dealing with conflicts between uses and users, coordination of water use and rules for water allocation at the management unit (river basin or administrative region);
- **Operational function**, addressing issues related to the provision of water services, water use and control for specific purposes, needs and demands such as domestic water supply and sanitation, irrigation and drainage flood protection, hydropower, industrial supplies, tourism, wastewater treatment etc.

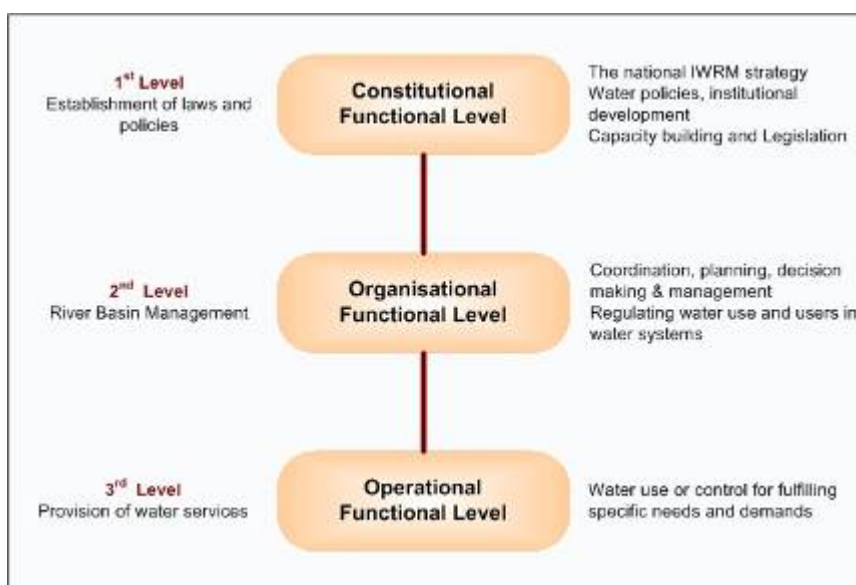


Figure 2: Functional levels in an IWRM framework

The third level, “Typology of alternative responses” will be addressed in subsequent stages of INECO, through the identification of alternative instruments which can help address the issues at hand. Outcomes will form part of the guidelines that will be developed by the Project, and which will integrate cross-regional issues, lessons from international experience in order to facilitate the adaptation of proposed responses to the regional/national water management contexts.

1.2 Typology and the local INECO participatory processes

INECO is a project that builds on the constructive engagement and participation of local stakeholders, decision and policy makers, actors of the civic society, and end-users to help identify significant local water management issues and discuss alternative options. The overall process, already described in other INECO Deliverables is based on the Logical Framework Approach, and is divided in three major stages:

- **Situation & Problem Analysis:** Identification of stakeholders, their key problems, constraints and opportunities and determination of cause and effect relationship between threats and root causes that contribute to the issues at hand;
- **Analysis of objectives:** Development of objectives from the identified problems and identification of means to end relationships;
- **Option analysis:** Definition and evaluation of potential alternative options and strategies to achieve the desired objectives.

In this regard, Figure 3 describes the inter-linkages between the developed typology and the project’s participatory process, towards the formulation of guidelines on institutional and economic instruments.

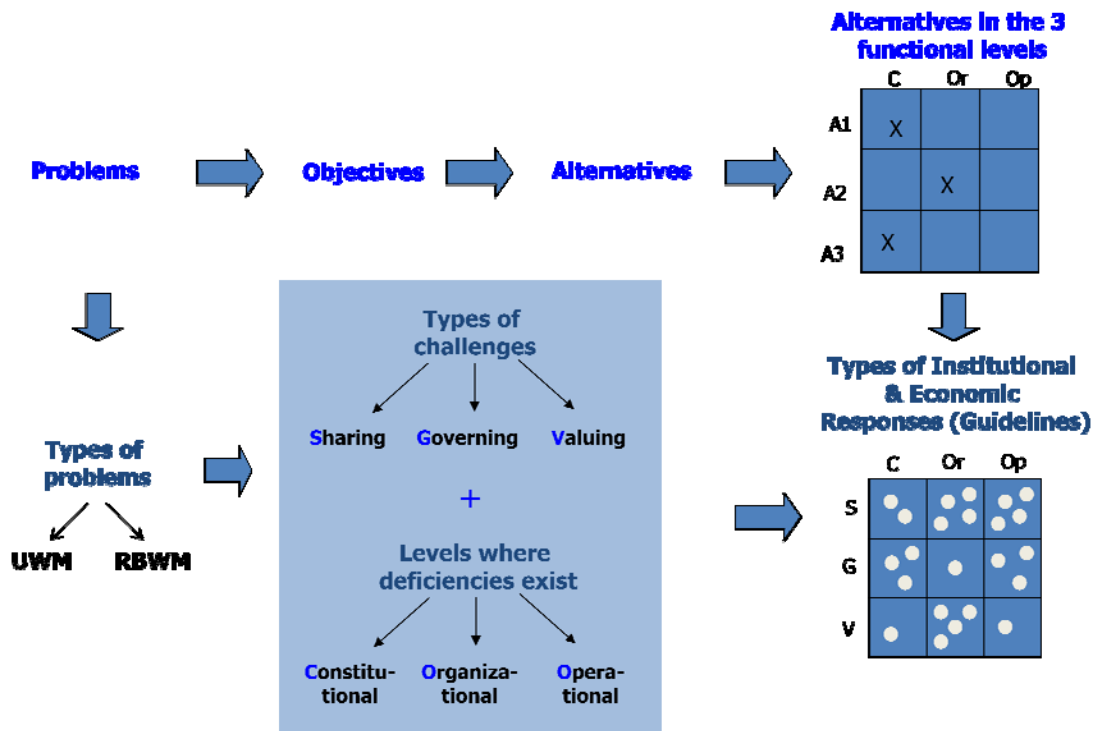


Figure 3: The INECO Participatory Process, the INECO Typology and the development of guidelines

Guidelines, the final output of INECO, will pursue the development of recommendations, integrating the particular socio-economic environment and traditional practices of water management in the analysed Mediterranean regions, focusing primarily on the aspect of public participation and the institutional mobilisation and capacity building required for the application of economic instruments and transparency of water and cost allocation. On the basis of the analysis conducted, and information collected during the previous phases of the project, the guidelines will define the institutional prerequisites for the application of alternative economic instruments that could enable a more transparent, equitable, environmentally and economically sustainable allocation of resources, adapting the lessons learned from previous and current research efforts and from the implementation of INECO.

2 Defining a typology of water management problems

2.1 The scope of the INECO Case Studies

From its early stages and in order to facilitate the development of participatory processes as a tool for identifying problems and proposing alternative instruments, INECO adopted a case study-driven approach. The scope of the INECO Case Studies, which in turn defined the content of the regional analyses of the project, was formulated upon consultation with local stakeholders to select water management issues that are presently important. Furthermore, the Case Studies, one in each of the countries analysed in INECO, Cyprus, Tunisia, Egypt, Lebanon, Syria, Algeria and Morocco, focus on a water management issue of broader importance to water management in the Mediterranean Basin. In brief, the selected focal water management problems per country are:

- **Egypt:** *Water quality deterioration* in the region of the *Bahr Basandeila Canal of the Dakahlia Governorate*, where waste disposal, heavy use of pesticides, inadequate domestic wastewater treatment, and uncontrolled discharge of industrial effluents have transformed the open waterway to a repository and conveyor of liquid waste. The major water pollution issue, which is common in the entire Nile water distribution network, poses great risks for human health, agricultural production, and the river and coastal ecosystems.
- **Syria:** *Water pollution in the Barada River Basin (Greater Damascus Area)*, due to the discharge of high loads of industrial and domestic waste and wastewater, which exceed the river's self purification capacity, and the decrease of river flow, resulting from rainfall decrease and use of the Feige Spring for drinking water supply. Water pollution has caused the collapse of the Barada river ecosystem, which also sustains the large forest of "Ghouta", a cultural heritage area and environmental hotspot in the region.
- **Lebanon:** *Increasing water stress* for meeting domestic, agricultural and industrial water demands *in the Damour River Basin*, further exacerbated by upstream pollution, groundwater interbasin transfer, and lack of financial and technical capacity to address infrastructure requirements and enforce legislation on water resource protection.
- **Cyprus:** *Aquifer depletion and sea intrusion in the Pegeia region*, which results from overpumping in order to meet domestic and tourist needs in the region.
- **Tunisia:** *Groundwater degradation*, mostly due to uncontrolled abstractions for irrigation purposes and the inadequacy of the presently applied alternatives and disincentives to groundwater overexploitation; water reuse is barely practiced, due to the low quality of treated water, soil types and cropping patterns, and most importantly due to farmer unwillingness to pay for treated wastewater. The problem is further exacerbated by the lack of technical capacity in the agricultural sector, the limited application of water saving methods in irrigation and the current water-intensive cropping patterns.

- **Algeria:** *Pollution of the Seybouse River*, which receives large volumes of untreated industrial and domestic effluents posing both direct and indirect risk on human health, agricultural production and the river ecosystem.
- **Morocco:** *Increasing water stress in the Oum Er Rbia River Basin*, resulting from increasing demand and inefficient water use in the agricultural sector, where high losses in irrigation distribution networks combined with the currently adopted irrigation practices (non-efficient irrigation methods and water intensive, non-economically sustainable cropping patterns) contribute to significant water waste.

As mentioned above, all problems are typical of the current water management challenges faced by Southern Mediterranean countries; issues like increasing water stress, inefficient water allocation use, water quality deterioration and need for additional infrastructure development to cope with increasing population and limited water availability are challenges that all Mediterranean Countries are facing in specific regions or globally, at the national level. Therefore, it can be expected that the analysis of these problems can provide valuable lessons not only at the Case Study level, but also in a broader context. In this perspective, the more detailed classification of the INECO Case Studies' scope attempted in Section 2.2 can assist in highlighting commonalities and differences to similar water management issues of interest.

2.2 The typology of water management issues

As a first step (Table 2), focal problems examined in INECO can be grouped in two major categories: those mostly associated with water quantity management (water shortage, overexploitation) and those associated with water quality management. It should be noted that the Lebanon case forms a distinct example that touches upon both issues (water stress due to the inefficient allocation of limited water supply, but also due to pollution, i.e. quality deterioration of available supply).

Table 2: Water quantity and water quality dimensions of the INECO Case Studies

Case Study Area	Water quantity	Water quality
Pegeia, Cyprus	+++	
Tunisia	+++	
Bahr-Basandeila, Egypt		+++
Damour River Basin, Lebanon	+++	+++
Barada River Basin, Syria	++	+++
Seybouse River Basin, Algeria		+++
Oum Er Rbia Basin, Morocco	+++	

Furthermore, the aforementioned problems can be classified into two broad categories:

- Issues mostly associated with River Basin Management and Planning;
- Issues mostly associated with Urban Water Management and Planning.

This classification is presented in Table 3, and is strongly linked with the overall socio-economic development pattern and trends experienced in each region. For example, in Syria the problem is exacerbated by urban growth (hyper-urbanization). Pressures exerted on the Barada River are linked to the rapid development of the greater Damascus area; similarly, the pollution of the Seybouse River in Algeria is mostly due to industrial activity and lack of infrastructure in rapidly expanding urban areas. Water quality deterioration in the Bahr Basandeila Canal is due to the lack of infrastructure for the collection and treatment of domestic sewage and poses threats to the quality of drinking water supply. Furthermore, in all three cases the issue of sustainable water service provision and expansion of existing infrastructure (drinking water supply and/or sewerage networks) is a key point.

Table 3: Scope and associated issues for the INECO Case Studies

Case Study Area	Scope	Associated issues
Pegeia, Cyprus	River Basin Management/ Groundwater depletion	<ul style="list-style-type: none"> Wastewater reuse & competition between uses/ Development patterns
Tunisia		
Seybouse River Basin, Algeria		
Oum Er Rbia Basin, Morocco	River Basin Management/ Water Allocation	<ul style="list-style-type: none"> Intra and inter-sectoral water allocation at the basin level
Damour River Basin, Lebanon		
Bahr-Basandeila, Egypt	Urban water management	<ul style="list-style-type: none"> Hyper-urbanisation Sustainability of water services
Barada River Basin , Syria		

River Basin Management and Planning groups the cases of Damour, Lebanon, Oum Er Rbia, Morocco, Tunisia, and Pegeia, Cyprus, with the last two focusing on groundwater management. In all cases, overexploitation of surface and/or groundwater resources is an issue that induces conflicts over water use and environmental degradation. It should be noted however that the management of the Pegeia aquifer is also linked to the rapid development of the area, the change of land-use patterns and the need to further develop and sustain tourist activities (issues that can be associated with land use planning/zoning). However, the relatively small population of the area, and the size and type of agglomerations does not justify the classification of the problem to the category of “Urban management”.

In the above context, Table 4 attempts a classification of the effects of the issues at hand, as identified by local stakeholders through dedicated workshops and consultation meetings, thus highlighting commonalities and differences in the environmental and socio-economic “symptoms” of the problems.

Table 4: Classification of “effects” or “symptoms” of the focal water management problems analyzed in INECO¹

Context	Socio-economic effects	Environmental effects
Urban water management and planning	<p>Increased conflicts among water users (DZ)</p> <p>Increased health risks (DZ, SY) and correspondingly higher direct and indirect costs (SY)</p> <p>Serious health and quality of life problems (EG)</p> <p>Reduction of agricultural productivity (EG)</p> <p>Decrease in income from tourism due to low water quality (EG, SY)</p> <p>Higher cost for the production of safe drinking water (SY)</p> <p>Drop in real-estate values (SY)</p>	<p>Low quality of irrigation water/water becomes unsuitable for irrigation (DZ, EG)</p> <p>Loss of biodiversity (EG, SY) and fisheries (EG)</p> <p>Threats to aquatic ecosystems (EG)</p> <p>Groundwater contamination (EG, SY)</p>
River Basin management and planning	<p>Increased conflicts among water users (LB, MA)</p> <p>Increased social costs (LB)</p> <p>Increased health problems due to the use of polluted water (LB)</p> <p>Reduction in agricultural income (TN)</p> <p>Increase of unemployment in rural areas (TN, MA)</p> <p>Higher cost for alternative supply (CY)</p> <p>Lack of strategic reserves to cope with drought (CY, TN)</p>	<p>Water shortage in peak demand seasons (LB)</p> <p>Desertification phenomena (TN)</p> <p>Groundwater degradation and increased salinity levels (TN, CY)</p>

Following from this classification of effects, the major drivers that lead to the exacerbation of the focal water management problems is presented in Table 5.

¹ List of abbreviations:

EG: Egypt; MA: Morocco; DZ: Algeria; LB: Lebanon; SY: Syria, CY: Cyprus; TN: Tunisia

Table 5: Drivers contributing to the exacerbation of focal water management problems in the INECO Case Studies

Case Study Area	Major Driver 1	Major Driver 2
Pegeia, Cyprus	Urban and tourism development	Drought episodes
Tunisia	Agriculture	Other forms of economic development
Seybouse River Basin, Algeria	Industry	Urban development/expansion
Oum Er Rbia Basin, Morocco	Agriculture	Droughts/Climate Change
Damour River Basin, Lebanon	Increase of demand (all water use sectors)	Inter-basin transfer
Bahr-Basandeila, Egypt	Urban development/expansion	Agriculture
Barada River Basin , Syria	Urban development/expansion	Industry

It becomes evident that the water sector in all the above regions needs to face up to challenges that originate from the implementation of other policies, related to patterns of economic development and broader social goals. In addition to the need for a wider integration of water-related issues in overall policy formulation and implementation, deficiencies in water policies themselves, combined with lack of adaptive capacity, often impede the effective implementation of options to mitigate the issues faced. In this perspective, the following section attempts a more in-depth analysis of the specific underlying causes of the INECO focal problems.

3 Defining a typology of underlying causes

3.1 The “Sharing” dimension of the INECO Case Studies

All the INECO Case Studies have a “Sharing” dimension, either related to the symptoms (effects) or the causes of the analysed problems. “Sharing” problems occur at the river basin level (allocation of water among water uses) and at the provision of water services (allocation of water among users) and can be also linked to pollution generated from upstream diffuse and point sources. In some cases (Damour, Lebanon, and Oum Er Rbia, Morocco), inter-basin transfers for supplying neighbouring areas also contribute to the exacerbation of local problems. This section provides an overview of the “Sharing” problems associated with the INECO Case Studies, and comments upon the mechanisms applied for water allocation and conflict resolution. Furthermore, it describes issues relevant to the gender dimension of the INECO Case Studies, and access to water services.

3.1.1 *Conflicts over water allocation and use*

According to C. Howe (1979), water conflicts can be classified into three categories:

1. Conflicts over the use of present supplies;
2. Conflicts over future water development;
3. Conflicts arising over water policies and the institutional framework for policy execution.

In this section we deal with the first two categories; conflicts arising over water policy and institutional deficiencies/gaps are examined in Section 3.3 (“Governing” dimension). It should be noted that all these categories are not independent of one another. For example, groundwater overexploitation can be placed under the first or the second category; it is also clear that the way of resolving conflicts over the use of present water supplies impacts on future water development. Similarly, the way that water policies are implemented can also induce conflict, as “conflicts” often refer to a situation in which the perceived improvement of one or more user groups is accompanied by a perceived decrease in the well-being of others.

For the purposes of this analysis we focus on the following categories of “conflict”, summarized in Table 6:

1. Conflicts originating from pollution (i.e. deterioration of surface and groundwater quality from specific activities);
2. Conflicts originating from groundwater overexploitation;
3. Conflicts originating from water allocation processes at the river basin level;
4. Conflicts originating from sharing resources with users outside the area of interest (Inter-basin transfer).

Table 6: The “Sharing” dimension of the INECO Case Studies

Case Study Area	Type(s) of water conflict
Pegeia, Cyprus	2
Tunisia	2
Bahr-Basandeila, Egypt	1
Damour River Basin, Lebanon	3, 4
Barada River Basin, Syria	1
Seybouse River Basin, Algeria	1
Oum Er Rbia Basin, Morocco	3, 4

Pollution (deterioration of the quality of water made available to some users for specific purposes as a result of the activities of others) is cited as cause to water problems in the Case Studies of Lebanon, Syria, Egypt, and Algeria. Furthermore, the problem is reported as significant in the case of the Oum Er Rbia, Morocco. Similarly, stakeholders in Cyprus have repeatedly expressed their concern over the potential contamination of groundwater with nitrates as a result of the agricultural activities of the region. This statement however is not supported by the measured nitrate concentrations in borehole samples. In all cases, pollution originates from agricultural and industrial activities located upstream or in the vicinity of surface water bodies (river and lakes) or groundwater bodies used for drinking water supply. Industrial pollution is the key problem in the cases of Algeria and Syria, due to the reported uncontrolled discharge of industrial wastewater and the lack of corresponding wastewater facilities. A reported cause to the problem is also the lack of sewage collection and treatment infrastructure (Algeria, Lebanon, Cyprus, Syria and Egypt).

Groundwater overexploitation is the primary cause of aquifer depletion in Tunisia, linked to the irrational use of water in crop irrigation. Similarly, groundwater exploitation causes concern in the Pegeia area; however, in this case, and as a result of measures implemented, groundwater from the aquifer is only used for domestic water supply. However, it is considered that the rapid tourism and building development of the area cannot be supported by groundwater resources alone. In both cases, groundwater overexploitation is also linked to future water development, as groundwater is considered as a strategic reserve for coping with droughts.

Competition over water allocation also arises at the inter-regional level in the cases of Lebanon and the Oum Er Rbia. In the Damour River Basin, groundwater is extracted by the Beirut Water Authority to supply water needs in the Beirut Metropolitan Area. Groundwater exploitation in this case causes the concern of local authorities and motivates stakeholders to demand the development of additional hydraulic infrastructure in the area, in order to ensure adequate and reliable water supply. In the Oum Er Rbia, and according to the National Master Plan and priorities, surface water is used to supply the water needs of the cities of Casablanca and Marrakech. In this case, and due to the increasing water stress and the inability to meet local agricultural demand, the Hydraulic Agency proposes the restriction on quantities transferred or that water is conveyed to the region from other Hydraulic Basins in the vicinity.

Water allocation at the river basin level is also an issue in the Damour and in the Oum Er Rbia River Basins. In the first case, water allocation problems concern the sharing of surface water resources among upstream and downstream users. It is reported that downstream water users, and farmers in particular, experience water shortages during the summer period, as a result of excessive abstraction upstream. In the Oum Er Rbia the issue is related to the use of water among the different irrigation perimeters and the intra-sectoral allocation of water available, depending on the type of crop and the irrigation method applied.

3.1.2 Mechanisms and processes for “water sharing”

The corresponding chapter of the first volume of the World Water Development Report (UN, 2003) outlines the problems related with water allocation and describes measures and operational mechanisms for water sharing, both the routine bulk water supply and the limited resources available during times of shortage. Table 7 summarizes the mechanisms for “water sharing” in the INECO Case Studies.

Table 7: Mechanisms for water sharing in the INECO Case Studies²

Mechanism	CY	TN	EG	LB	SY	DZ	MA
Catchment socio-economic priorities	+	+	+	+	+	+	+
Legislatively predefined priorities/hierarchy of use	+	+	+	+	+	+	+
Demand management (during shortages) targeted at certain sectors in priority	+	+	?	?	+	N/R	+
Harmonization of sectoral policies and laws	+		?	?	?	?	+
Tariff disincentives and targeted subsidies as an economic influence on sharing through pricing differentials for different purposes	+	+	?	?	+	?	+
Abstraction management (issuance of permits/licenses) to limit water use for particular purposes or during particular seasons	+	+	+	+	+	N/R	N/A
	(?)	(?)	(?)	(?)	(?)		
River water quality objectives (established on particular river systems), which through discharge/treatment/quality standards ensure water of quality fit for downstream purposes	+	N/R	?	?	-	-	N/R
Prescribed flow points	+	N/A	N/A	N/A	N/A	N/A	+
Reservoir operating rules (often optimized to meet different purposes), multireservoir system management (optimized to meet different demands) and reservoir compensation flow releases	+	+	+	N/R		N/R	+

² Legend: (+) Existing; (?) Not effectively implemented; N/R: Not relevant to the case study context; N/A: No answer provided.

The definition of priorities over water use is common in all the Case Studies considered, as drought episodes are quite common and require strong regulation over water use. However, there are cases when the implementation of these priorities becomes difficult, as for example in the Damour River Basin. Along the same line, rationalization of water uses in times of shortage and clear definition of reservoir operating rules, are mechanisms that are often being applied. The harmonization of laws and policies in place is an ongoing effort in all countries, with the exception of Cyprus, where the Water Law for the transposition of the EU Water Framework Directive, in combination with previous efforts have managed to eliminate previous overlaps and contradictions/legislative gaps. Problems arise as to the effective implementation of frameworks for abstraction management (Cyprus, Lebanon, Tunisia, Morocco) and the achievement of objectives on river water quality through the monitoring and control of discharges (Syria, Algeria, Egypt), as these require technical capacity and strict enforcement, not subject to political pressure from the affected user groups.

3.1.3 Gender issues

Gender-related issues were not identified by stakeholders as important in any of the INECO Case Studies, with the exception of Cyprus and Egypt, where in local activities and workshops the importance of the role of women in water saving and pollution prevention and control was highlighted.

In this regard, Table 8 summarizes information on gender issues based on the country profiles developed within the framework of the ongoing GEWAMED project (*Mainstreaming Gender Dimension Into Water Resources Development and Management in the Mediterranean Region*). Information is mostly oriented towards gender and equity issues in rural areas, and is provided for Cyprus, Morocco, Egypt, Algeria, and Syria. Information on Lebanon and Tunisia were not available at the time that this report was written.

Table 8: Information on gender issues in the INECO countries (Source: GEWAMED project)

Country	Main issues reported
Cyprus	Despite women’s important contribution to family farming and rural life, their work is generally undervalued. Usually, in using the concept of labour for statistical purposes, the significant portion of women’s work necessary for housekeeping, household maintenance and children’s care is ignored. Moreover, female labors used for a wide variety of tasks in the sphere of production is neglected, not recognized or merely considered ‘complementary’ to the work of male family members.
Morocco	Rural women in Morocco participate in irrigation, but their participation simply consists in performing unqualified tasks. In fact, women have the experience acquired through in-field experience, but they are not capable of mastering irrigation technically. Causes for that are manifold, some of them being: (a) the lack of access to land ownership prevents them from being member of Water Users’ Association (WUAs), which refuses to recognize their access to water and thus limits agricultural productivity; (b) the women’s lack of access to credit and financial services since they cannot give any guarantee to their land; (c) the absence of specialised services of water and irrigation in the field of consultancy and guidance; (d) difficulty

Country	Main issues reported
	in having access to the sources of information because of high illiteracy rate (80% of rural women) and men-oriented information.
Syria	The integration of women in all aspects of the development process has received considerable attention in all national events. Nevertheless, women's participation in conservation and development initiatives is often affected by their insufficient decision-making power within the household, the farm, and the community.
Egypt	As many investigations have concluded that women play an important role in managing water in rural areas, research has been promoted to find out about the various obstacles facing rural women in managing water activities. These obstacles can be divided into different categories as (a) Educational (high illiteracy ratio and un-enrolment of girls at different educational levels); (b) Social and Cultural (decrease in women's opportunity in receiving their inherited share of lands; limited women's role in family decision-making, limited participation with men in the different society and water entities; lack of appreciation for women's responsibilities within the family; bad habits and traditions towards women. (c) Economical (women's role within the family is not considered an economic benefit by men, there is under development in the customary agricultural practices in old lands and limited financial resources for women due to not receiving their inherited shares in land) (d) Health obstacles (e) Political (lack of political knowledge, decrease in women's political participation) (f) Environmental and Institutional, since urbanization has switched rural women's role from productive to consumptive. Furthermore, there are inherent weaknesses in existing society institutions, there is lack of sanitation services in certain regions has degraded the different water vessels and lack of coordination among non-governmental organizations.

3.1.4 Access to basic water services and health concerns

Access to basic water services is a core component of all water management policies, within the framework of the global effort for the achievement of the Millennium Developmental Goals (MDGs). Efforts are made to provide an adequate quantity of safe drinking water supply, sanitation and wastewater collection and treatment facilities for urban and rural areas. The issue is perceived as a cause of variable importance to the water management problems in many of the INECO regions. The problem is more acute in the case of the Bahr Basandeila Canal, Egypt, where significant concerns are raised as to the quality of the drinking water provided and the protection of water abstraction areas. Stakeholders and citizens report health problems and inadequate and unreliable water supply provision.

Health concerns are also reported in the cases of the Barada River Basin, Syria and of the Seybouse River Basin, Algeria, due to the pollution of water courses and groundwater supplies. Although reported, the issue does not seem as significant in the case of the Damour River Basin, Lebanon.

3.2 The Economic (“Valuing”) dimension of the INECO Case Studies

Despite the extensive debates in international and national fora, the fourth Dublin principle (“Water has an economic value in all its competing uses and should be recognized as an economic good”) still remains controversial and not widely understood by several decision-makers and the public at large, as it is considered in conflict with traditional beliefs and values. However, awareness is growing on the economic dimension of water management issues, especially with regard to:

- The integration of water planning and management in the national policies for economic development;
- The achievement of efficiency in water allocation especially in cases of limited supply, taking into account social, economic and environmental needs;
- The recovery of water service costs, with the aim to guarantee long-term sustainability of water infrastructure;
- The improvement/increase of the financial resources allocated to the water sector for (a) developing new or rehabilitating existing infrastructures and (b) providing the appropriate economic incentives for encouraging water conservation.

In this section, we analyze issues related to the “valuing” dimension (or underlying causes) of the analysed water management issues, focusing on (a) cost recovery and funding for infrastructure development/rehabilitation, (b) economic instruments in place and (c) issues concerning the implementation of the “polluter-pays” principle and (d) the role of economics in water allocation. It should be noted that the analysis presented herein is preliminary, as it is ongoing; further information on economic instruments in place in the INECO Case Studies can be retrieved from forthcoming Deliverables (Deliverable 9 on “The range of currently applied economic instruments” and Deliverable 10 on “The identification of alternative instruments”).

3.2.1 Cost recovery and funds for infrastructure development

An often cited cause of all water management problems is the lack of financial resources, by water service providers or authorities, to timely implement appropriate measures and develop infrastructure for problem mitigation. With regard to infrastructure deficiencies, identified causes to water management problems are described in Table 9.

Table 9: Infrastructure deficiencies in the INECO Case Studies

Context	Case Study region	Additional infrastructure requirements
River Basin Management and Planning	Oum Er Rbia Basin, Morocco	– Rehabilitation of irrigation networks
	Damour River Basin, Lebanon	– Lack of hydraulic infrastructure (storage reservoirs) to regulate river water abstractions and offer alternative supply – Lack of infrastructure for sewage collection and treatment
River Basin Management and Planning	Pegeia and Cyprus	– Lack of alternative supply (desalination)
	Tunisia	– Rehabilitation of irrigation networks

Context	Case Study region	Additional infrastructure requirements
Planning / Groundwater management		
Urban water management and planning/Pollution prevention and control	Barada River Basin, Syria	<ul style="list-style-type: none"> – Poorly maintained sewerage network – Low share of population connected to sewerage networks/wastewater treatment
	Bahr Basandeila Area, Egypt	<ul style="list-style-type: none"> – Insufficient capacity for sewage treatment
	Seybouse River Basin, Algeria	<ul style="list-style-type: none"> – Delay in the implementation of sewerage facilities (however, mainly due to technical constraints)

Of these problems, it becomes evident that at least in the Case Studies of Lebanon, Syria and Egypt, the problem is also related to the low recovery of water service costs, which results in the ineffective operation of the system. As the corresponding charges are low and do not ensure adequate recovery, water services rely on the centralized financial system, where the allocation of funds is based on bureaucratic and time consuming procedures.

It should be noted however that infrastructure development problems do not only arise from lack of financial resources but also from the technical point of view. For example, in Cyprus, an EU Member State, the Government is pursuing the implementation of the relevant legislation (Urban Wastewater Treatment Directive), by developing sewerage schemes in all areas with more than 2,000 equivalent inhabitants. As such, in the Pegeia area, sewage collection and treatment facilities are in status of development. However, concerns are raised due to the rapid growth and urban development of the region (i.e. the expansion of facilities may not be able to keep up with the increase in building permits). Similarly, in Algeria, the State is funding the development of sewage facilities in the Seybouse River Basin. However, in this case, the delay in the implementation of the wastewater treatment units has contributed significantly to the environmental degradation of the River.

Furthermore, lack of financial resources is also often advocated as the main reason for the poor quality of water services provided in several areas (e.g. Damour River Basin, Bahr Basandeila region, Egypt, Barada River Basin, Syria). In these regions, fees and charges set for water services, especially for sewage collection and treatment, are generally considered low and important State subsidies need to be provided to water service providers.

3.2.2 Grants and economic incentives/disincentives

The lack of (or the need for additional) subsidies, grants and economic incentives is a common factor in all cases considered. Relevant provisions exist or are being pursued either as priorities of the national water policy (constitutional level) or as measures taken at the river basin management (organizational) or operational (water services) levels. However, it is pinpointed that measures need to be re-designed, priorities should be reset or that new

measures need to be introduced (Table 10), so as to encourage users towards water saving/pollution prevention.

Table 10: Deficiencies and issues associated with incentives and/or disincentives for water conservation and pollution prevention

Context	Case Study region	Deficiencies and associated issues
River Basin Management and Planning	Oum Er Rbia Basin, Morocco	<ul style="list-style-type: none"> – Need for additional incentives for irrigation method improvements – Low price of water for irrigation
	Damour River Basin, Lebanon	<ul style="list-style-type: none"> – Lack of incentives for water conservation/ irrigation method improvements
River Basin Management and Planning / Groundwater management	Pegeia and Cyprus	<ul style="list-style-type: none"> – Low cost of groundwater vs. other sources (surface water)
	Tunisia	<ul style="list-style-type: none"> – Low cost of groundwater vs. other sources (surface water) – Need for additional incentives for irrigation method improvements
Urban water management and planning/Pollution prevention and control	Barada River Basin, Syria	<ul style="list-style-type: none"> – Lack of (or need for additional) economic incentives to the industrial sector – Low water tariffs
	Bahr Basandeila Area, Egypt	<ul style="list-style-type: none"> – No commitment to implement pollution prevention measures
	Seybouse River Basin, Algeria	<ul style="list-style-type: none"> – Limited financial resources of industries to implement pollution prevention measures

3.2.3 Implementation of the “polluter-pays” principle

The polluter-pays principle is advocated in the water-related legislation of Cyprus, Algeria and Morocco. The wider approach towards the implementation of the principle is related to the introduction of appropriate economic instruments, internalizing the external costs associated with environmentally damaging behavior. However, the principle can often not be applied because of uncontrollable (legal or illegal) water pollution. Similar obstacles are encountered in the implementation of the “user-pays” principle because of uncontrollable (legal or illegal) access to water resources, mostly groundwater.

The recently updated water-related legislation of Algeria and Morocco foresees the operation of River Basin Agencies, adopting an institutional framework for River Basin Management similar to the French “Agences de l’Eau” model. The “polluter-pays” and “user-pays” principles are implemented through the foreseeable introduction of pollution charges and abstraction charges. However, and as the model is rather new, deficiencies exist as to its effective operation. For example, in Algeria, the relevant legislative decrees that would allow for the definition of pollution charges have not been yet issued. Industries do not pay an amount proportional to the pollution loads discharged to the water environment. It is expected

however that the enhancement of the knowledge base on water pollution of the Seybouse, along with the development of the corresponding inventories will allow more effective implementation and operation of the system.

Finally, it should be noted that in all the Case Studies, the effective implementation of the principle remains incomplete, because of technical constraints or institutional deficiencies. Diffuse pollution from agricultural activities or inability to monitor the abstraction from wells and boreholes call for the implementation of other approaches (voluntary schemes, community-based management, involvement of water users in decision-making etc.) Institutional deficiencies can comprise lack of financial resources, not fully developed monitoring programmes, lack of human resources and expertise, lack of equipment, multiplicity of authorities, fragmentation of responsibility etc. In some cases, social constraints (affordability concerns) or opposition and political influence from specific user groups are also of relevance (e.g. Case Studies of Cyprus, Lebanon, Tunisia).

3.2.4 Economic efficiency in water allocation

In all the Case Studies dealing with the allocation of limited water supplies, allocation is based on historical water rights and/or and socio-political priorities. Although the prevailing perception is that the current status quo should be maintained, in several cases stakeholders have pinpointed the need for better evaluating the overall socio-economic benefit generated from specific water uses, especially agriculture (Case Studies of Morocco and Tunisia). This is also strongly linked with the need to improve efficiency in water use, reduce water waste and modernize the agricultural sector, considering also the possibility of a shift towards less water-intensive crops.

Furthermore, and as the overall development pattern is changing and water availability is decreasing, stakeholders are becoming aware of the fact that legislative priorities and historical water allocation quotas need to be updated in favour of more rational and beneficial water use.

3.3 The “Governing” dimension of the INECO Case Studies

The first volume of the World Water Development Report (UN, 2003) highlights the fact that the water crises the world is facing today is essentially a crisis of governance. In the same report, an analysis is given on the use of the term in several contexts, ending with a definition of water governance as “*the range of political, social, economic and administrative systems that are in place to develop and manage water resources and the delivery of water services, at different levels of society*”. It is also pinpointed that the important shift in governance thinking is that development is now increasingly seen as a task that involves society as a whole and not the exclusive domain of governments.

As institutions are defined by rules, and rules create boundaries, it becomes necessary to know where the powers and funding to deliver different courses of action reside. Hence, one requirement while seeking to promote constructive engagement and propose alternative water management instruments, is to develop the institutional analysis for each of the different regions, by answering a series of questions, as for example which institution can do what, has which powers and what funding. The relevant domain is all those actions which may be

adopted in order to deliver sustainable water management at the local, regional, and national level.

The analysis of the institutional and legislative frameworks, mandates and responsibilities has been the main point of analyses undertaken by several international initiatives. The interested reader can refer to the analyses undertaken by the UN-ESCWA (1997), where comprehensive assessments were made concerning the historical evolution of water-related legislation, pertinent customary laws and water use rights, and the development of the overall organization of the water sector to cope with emerging water management challenges. Furthermore, a recent report of the World Bank has highlighted institutional issues related to water scarcity in the MENA Region (World Bank, 2007). Similar information for Cyprus can be retrieved in numerous pertinent reports from the Water Development Department and from several EU-funded research projects dealing with diverse water management issues in the country (WaterStrategyMan, 2002-2005, AquaStress IP, 2005-2009). Along this line, Deliverable 3 of INECO has detailed issues related to water sector organization, legislation and governance in all the countries concerned.

In the above perspective, in this report we attempt to summarize key issues on water governance that are considered critical for the INECO Case Studies. In this context, the following paragraphs describe deficiencies related to: (a) the overall organization of the water sector; (b) existing legislation and law enforcement; (c) limited public participation and community empowerment; (d) accountability, transparency and information sharing.

3.3.1 Overall organization of the water sector

The need for empowering institutions

Deficiencies in the organization of the water sector, overlaps in responsibility and need for better coordinated or decentralized management is a common factor in all the INECO Case Studies.

In Cyprus and despite the fact that water management operations are considered effective throughout the country, all actors pinpoint the need for re-allocating responsibilities for borehole permit issuing. Currently, borehole permits are issued by District Officers and not by the Water Development Department, the authority responsible for the execution of the National Water Policy in the country and for the assessment and allocation of both surface and groundwater supplies.

In Lebanon, the administrative and institutional framework is considered outdated in its majority and there are significant overlaps in responsibility.

In Syria, it is reported that there is lack of integration of functions among the different parties involved in water management operations, especially with regard to water policy and legislation formulation, water allocation and investment plans. Problems also stem from the lack of communication and data exchange among decision-makers, engineers, and water management specialists and professionals, and the lack of human resources which would enhance the development of an integrated water management plan. Regulatory principles for establishing a system of specialists were only recently drawn under the supervision of the Syndicate of Engineers.

In Algeria, water management responsibilities have been modified several times during the past 15 years. Especially water distribution has been often centralized and then decentralized. For example, irrigation water, previously managed by the Ministry of Agriculture, is now managed by the Ministry of Water Resources through the corresponding agency. The frequent changes have not assisted in simplifying the overall water management framework, and in developing the appropriate technical and human capacity and resources in the different departments/agencies.

In Morocco, the overall administrative and institutional setting suffers from the delay in the implementation of the Water Law. This delay is actually preventing a more rational management of water resources, and the application of the polluter-pays principle. Issues slow in implementation are mostly associated with the water charges that will constitute the financial resources of the Basin Agencies, and that would permit them to provide financial assistance in the development and protection of water resources.

In Tunisia and Egypt it is considered that there is some overlap in responsibility between water authorities and water institutions; however responsibilities are generally complementary and coherently allocated.

Decentralization & community-based management

Decentralization of water management operations at the lowest appropriate level and empowerment of water user associations is considered a key issue in all Case Studies, with the exception of Cyprus.

In Egypt, such efforts have been successful through the development of Water User Associations (WUAs). Lack of decentralization of water management at the river basin level is also considered a cause of water stress in the Damour River Basin. In countries where the organizational function has already been decentralized at the appropriate unit, (Morocco and Algeria), community involvement in water management is pursued as means to assist user groups in the management of their resources and facilitate modernization. A similar initiative is also undertaken in Tunisia, through the empowerment of Agricultural Development Groups (GDAs).

The involvement of the private sector

Given the often cited inability of the public sector to provide efficient water services and meet growing needs, in most cases, public-private partnerships have been perceived as a potential tool to attract capital investment and ensure efficiency in water delivery/provision of sewerage services. However, it should be noted that in all case studies, stakeholders consulted insisted that priority should be given to State-funding; the full privatization of water services is an issue of clear opposition. In this section, we summarize the context for the involvement of the private sector on the national level, as it is an issue related more to overall governmental policies rather than local decision-making.

In Morocco, there are private operators are monitored by a Committee, which ensures that the operator abides to its contract, and monitors the evolution of tariffs, as well as technical, administrative and financial management. Water tariffs are revised according to previous agreements with the Government. The Committees function under the supervision of the

Direction of Regies and conceded services (DRSC), under the control of the Ministry of the Interior.

In Cyprus and Syria private sector involvement is limited to construction contracts. As most water-related infrastructure has been completed in Cyprus, and there are no relevant problems with regard to the delivery of water services, privatization is not under examination. However, further strengthening the involvement

In Lebanon, the Government has been advocating private sector participation in many sectors including water, there are still many factors hindering private sector involvement. Reasons include gaps in the current legislative framework and unclear procedures for creating and sustaining public-private partnerships. In the absence of an overall strategy, the Government is pursuing a piecemeal approach, proceeding with a management contract with a private operator in the city of Tripoli and considering other arrangements supported by the World Bank in Baalbeck. Private sector participation efforts grow, partly due to the recognition of the weak performance, inadequate staffing, and poor resources of the regional water authorities. These efforts are closely linked to a planned merger of authorities, but a clear and broadly accepted understanding of the operational partnership among the central, regional authorities, and the private operators has not yet emerged and is probably a premature step in the overall process.

In Tunisia, the contribution of the private sector in the financing and operation of water infrastructure is limited to the maintenance of installations by local Development Groups of collective interest and to soil and water conservation structures consolidations by land-owners. Farmers finance on their own the excavation of wells and boreholes and are sometimes subsidised by the government, when a permit has been granted and the project has been approved by the authorities concerned.

In Egypt, there are whole ranges of options as to the ways in which straight operational contracts can be negotiated, which place the responsibility directly with the concession company and at the same time leaving direct control with the public utility. In major capital investments, however, the normal major water and sewage treatment projects are the build, operate, transfer arrangement or BOT. In BOT type projects the private sector organization has the responsibility of: design, construction, operation and maintenance and project funding. Many public utilities in addition to controlling charges and establishing their own standards of service, want to retain a direct involvement in the design, construction and operation of their water infrastructure. It is possible to achieve this objective and at the same time, through a joint venture, introduce the latest "private sector" technology, operational and design know-how into the utility company, together with the shared funding of capital investment for new works and infrastructure. This type of arrangement links the public sector utility to a private company, or group of companies, in order to develop water services through both operational and capital investment projects.

Public –private partnerships are being used for improving the efficiency of water services and could be achieved through several approaches (level of private involvement in management, construction of infrastructure, ownership).

3.3.2 Legislation, laws and regulations and enforcement

Legislation updating to cope with new or emerging water management problems and enforcement of the relevant provisions are a considered primary causes to focal problems of all the INECO Case Studies. Despite the fact that in most cases the relevant provisions and regulations exist, they often remain inactive, due to:

- Lack of technical and/or financial capacity, especially with regard to the monitoring of groundwater abstractions and industrial wastewater discharge.
- Social pressures from user groups and lack of alternative water supply, particularly in the case of groundwater exploitation and use.

These issues are summarized in Table 11.

Table 11: Underlying causes of poor legislation enforcement on water abstractions/discharges in the INECO Case Studies

Context	Case Study region	Underlying causes
River Basin Management and Planning	Oum Er Rbia Basin, Morocco	– None identified in the Case Study context
	Damour River Basin, Lebanon	– Limited enforcement of legislation on discharge standards – No monitoring of water quantities abstracted upstream
River Basin Management and Planning / Groundwater management	Pegeia and Cyprus	– Inability to monitor groundwater abstractions (both from illegal and legal boreholes and wells)
	Tunisia	– Lack of regulation and control over abstractions from water tables
Urban water management and planning/Pollution prevention and control	Barada River Basin, Syria	– Inadequate law enforcement for the violation of discharge standards due to the lack of efficient monitoring systems
	Bahr Basandeila Area, Egypt	– Inadequate law enforcement due to deficiencies of the discharge permit system and lack of efficient monitoring
	Seybouse River Basin, Algeria	– Limited enforcement of legislation on discharge standards due to lack of technical capacity and institutional empowerment

Efforts to cope with the issues have compelled the establishment of a “water police”, in Algeria, Morocco and Syria. In Algeria and Syria a grace period was provided to the industrial sector to comply with the pertinent legislation.

With regard to groundwater management, easy access to groundwater is perceived a cause of groundwater overexploitation in Tunisia. Indirect control of abstractions is exercised through the provision of soft loans for borehole drilling outside of irrigation perimeters. In Cyprus, and given the fact that the majority of groundwater bodies have been identified as “under risk” or “vulnerable”, strict procedures are applied for new borehole drilling. However, the

numerous boreholes and wells already operating in both countries render the monitoring and control of groundwater abstractions either ineffective or impossible. Instead, emphasis is given to providing incentives for efficient water use in agriculture (the major groundwater user) and in the domestic/tourist sector. The effort has already been successfully implemented in Cyprus and is underway in Tunisia.

3.3.3 Awareness and public participation

The development of the IWRM Process for more sustainable and socially equitable water resources management includes public participation aimed at ensuring that the interests of all stakeholders, including water users and the civil society are taken into account and are adequately addressed. In a participatory process, all citizens, both men and women, should have a voice, directly or through intermediary organizations representing their interests and throughout the process of policy and decision making.

The lack of public participation is recognized as a cause to water management problems in all of the INECO Case Studies. However, stakeholder (and authorities’) opinions are diversified as to the form of public participation that is considered as lacking (simple awareness on the importance of issues and on rights/obligations, commitment to implement mitigation measures, public consultation or deliberative processes), and with regard to the way that public participation should be pursued. Table 12 summarizes issues related to the lack of public participation, awareness and community involvement within the context of the INECO Case Studies.

Table 12: Issues associated with poor public participation in the INECO Case Studies

Context	Case Study region	Issues associated
River Basin Management and Planning	Oum Er Rbia Basin, Morocco	– None identified
	Damour River Basin, Lebanon	– Limited cooperation/joint planning for surface water allocation – No institutional platforms in place
River Basin Management and Planning / Groundwater management	Pegeia and Cyprus	– Lack of a “water culture” among local residents
	Tunisia	– Lack of farmer awareness for rationalizing groundwater use – Social pressure from sensitive/affected user groups on procedures for borehole authorization
Urban water management and	Barada River Basin, Syria	– None identified

Context	Case Study region	Issues associated
	Bahr Basandeila Area, Egypt	<ul style="list-style-type: none"> – Limited awareness of environmental impacts and best practices in the use of agrochemicals – Insufficient interaction between authorities and beneficiaries, local residents and NGOs
	Seybouse River Basin, Algeria	<ul style="list-style-type: none"> – Lack of cooperation and joint decision-making

Furthermore, in several INECO Case Studies, consulted actors and stakeholders underline that there is lack or deficiency in key elements that can make participation and empowerment efforts successful.

Access to information on water-related issues is considered lacking almost in all cases. It should be noted however that in some Case Studies there is limited access to information because there is lack of relevant information (i.e. inventories, monitoring systems, etc. have not been yet put in place). This is the case in the Seybouse River Basin, Algeria. In Cyprus, stakeholders identify lack of information at the local level. In fact, limited information is made available for the local problem of the management of the Pegeia aquifer, while information at the river basin district level in the context of the WFD implementation is disclosed to the general public. Furthermore, there are cases where there is limited transparency in water management decision-taking or where water management decisions are not adequately communicated to the general public or the targeted user groups. Finally, in the Case Studies of Damour, Lebanon and Barada, Syria, decision-makers and consulted stakeholders underpin deficiencies in the lack of local organizational capacity, i.e. the ability of people and authorities to work together, organize themselves and mobilize resources to solve problems of common interest.

3.4 Deriving a typology of underlying causes

3.4.1 An assessment of institutional frameworks

On the basis of information and data provided in this report, and in previous Deliverables of INECO, this section aims at performing an on-the-spot review of the effectiveness of institutional frameworks in the countries examined, taking into account the problems experienced on the Case Study level. Such an assessment cannot of course be considered comprehensive, as in all countries the reform of the water sector to ensure sound water governance is already well underway. In this regard, the analysis presented below can only be considered as a “snapshot” of the current progress towards the achievement of Integrated Water Resources Management, based on experience from the analyses undertaken at the local level and not in the broader national context of water policy formulation.

The assessment follows the framework suggested by Van Hofwegen and Jaspers (1999) and is undertaken with regard to the three functions, presented in the introductory section of this

report: (a) the constitutional function; (b) the organizational function and (c) the operational function.

After the same authors, the basic requirements for IWRM in the **constitutional function** is a system that:

- Enables effective development and implementation of laws and regulations,
- Enables effective constitution and development of relevant institutions,
- Regulates decision making based on interests of all stakeholders,
- Enables all stakeholders to participate in decision making,
- Provides quantitative and qualitative standards for use and effluents,
- Enables and regulates effective control and sanctioning of violations,
- Enables implementing agencies to take the necessary steps to secure and conserve the resource,
- Provides effective and transparent accountability mechanisms.
- Provides sufficient capable people to meet the IWRM demands of policy making, adapting legislation and all other activities
- Enables and regulates private sector participation.

The ultimate goal of processes undertaken in the **organizational function** is to allocate water in quantity and quality terms for different purposes. The process involves resource assessments, planning, decision making, implementation and policing on allocations and use of water resources with and based on the interest of stakeholders. These processes are time and location specific. However, some general activities in this complex process can be identified and are listed below in Table 13.

Table 13: Activities of the Organizational Function in IWRM (Savenije, 1997)

Context	Activities
Assessment	<ul style="list-style-type: none"> – Water resources assessment (quality and quantity) – Environmental assessment
Planning and decision making	<ul style="list-style-type: none"> – Problem analysis – Activity analysis – Demand analysis and demand forecasting – Formulation of objectives and constraints – Design of alternative water resource systems – System analysis – System simulation and optimization – Sensitivity analysis – Multi criteria and multi constraint tradeoff analysis – Selection and decision making – Involvement of stakeholders
Implementation	<ul style="list-style-type: none"> – Allocation of water resources – Demand management – Administration of service provision to water institutions – Operation and maintenance – Monitoring and evaluation – Financial management and performance auditing

Context	Activities
	– Communication, negotiation and conflict resolution
Policing	– Inspection and control – Sanctioning

Along the same line, the effective **operational functioning** within an IWRM context requires a management system that responds to societal needs. This means that for water services the system should enable, provide or regulate:

- Effective control of the service providers by users/clients and the IWRM Platform
- Representation of clients interests at and by the managing agency
- Cost recovery by the service provider.
- Negotiations between the managing agency/service provider and its clients on the level of service it provides and recovery of its associated cost,
- Assessment of the demands, actual use and availability of water (quantitative and qualitative)
- Power at the service provider to control and sanction violations;
- Sufficient capable people to meet the IWRM demands, planning, development and management of services provided;
- A system that allows market incentives to make most economic use of water through participation of private sector.

As presented in the previous chapters, in all the INECO Case Studies there are deficiencies (minor or major) in the above aspects. Table 15 summarizes the main issues that are considered of relevance and significance within the local Case Study context.

3.4.2 A typology of underlying “Sharing”, “Governing” and “Valuing” causes in the INECO Case Studies

As demonstrated above, although diverse, the Cases analysed within INECO present commonalities on the underlying causes of focal water management problems, which beyond the technical challenge, call for improved decision-making, effective governance, improved application of economic instruments, and increased public awareness and participation.

Table 14 summarizes the underlying causes of those problems, in relation to the “Governing”, “Valuing” and “Sharing” challenges. The matrix demonstrates that, although potential solutions to water problems are in most cases well known they have often not been implemented due to common underlying causes:

- Organisational problems, related to the lack of funds, facilities, capacity and procedures, but also to inadequate legal imperatives and administrative guidelines;
- Social perception issues, linked to both the lack of a societal understanding by decision and policy makers and of the underlying causes to water-related issues, but also to limited awareness and participation of stakeholders and affected/affecting user-groups.

Table 14: The typology of the main causes of focal water management problems analysed within INECO

Country/Region	Sharing water			Valuing water			Governing water				
	S1	S2	S3	V1	V2	V3	G1	G2	G3	G4	G5
Cyprus	+	+			+				+	+	
Tunisia		+		+	+	+	+	+	+		
Bahr-Basandeila Region, Egypt		+	+	+	+		+		+		+
Damour River Basin, Lebanon	+	+	+	+	+		+		+		+
Barada River Basin, Syria		+	+	+	+		+	+	+	+	+
Oum Er Rbia River Basin, Morocco	+	+		+	+	+	+	+			
Seybouse River Basin, Algeria		+		+	+		+	+	+	+	

Table notes

Sharing Causes	Valuing causes	Governing causes
S.1: Water allocation conflicts S.2: Ineffective management of shared resources S.3: Access to water services	V.1: Low recovery of water service costs V.2: Ineffective application of the polluter-pays principle V.3: Inefficient water allocation	G.1: Problems in the financing/planning for technical solutions & water works G.2: Limited/no public participation and awareness G.3: Inability/unwillingness to enforce legislation G.4: Overlaps in responsibility G.5: Lack of human/technical resources

Table 15: A tentative assessment of institutional frameworks within the context of the INECO Case Studies

	RBM/GWM				UWM		
	LB	MA	CY	TN	SY	DZ	EG
Constitutional function							
Effective development and implementation of laws and regulations	-	+	+/-	+/-	+/-	-	+/-
Decision making based on interests of all stakeholders	-	+	+	+/-	+/-	+/-	+/-
Enables all stakeholders to participate in decision making	-	+/-	+	+/-	+/-	-	+/-
Effective and transparent accountability mechanisms	-	+/-	+	+/-	-	-	-
Provides quantitative and qualitative standards for use and effluents	+	+	+	+	+	+	+
Human resources to meet the IWRM demands of policy making, adapting legislation and all other activities	+/-	+	+	+/-	-	+/-	+/-
Enables and regulates effective control and sanctioning of violations	-	-	+/-	+/-	+/-	-	+/-
Organizational function							
Assessment	+	+	+	+	+/-	-	+
Planning and decision making	+/-	+	+	+/-	+/-	+/-	+
Policing	-	+/-	+/-	+/-	+/-	-	-
Operational function							
Cost recovery by the service provider	-	-	+/-	+/-	+/-	N/A	-

4 Concluding remarks – Next steps

IWRM should be seen as a comprehensive approach to the development and management of water, addressing its management both as a resource and the framework for provision of water services. Towards this end, achieving sustainable water management points to four dimensions, to which effective water governance should be achieved (UN, 2006). In this regard, and in response to the ongoing discussions that are being developed within the framework of the INECO Case Studies, Table 16 summarizes some key policy-related questions that stem from the regional analyses, and that will frame the analysis in subsequent stages of the project (Identification of alternative institutional and economic instruments, and development of guidelines).

Table 16: Policy questions emerging from the INECO Case Studies

Case Study Context	Theme	Policy-related questions
River Basin Management	Supply enhancement vs. Demand management	<ul style="list-style-type: none"> – Infrastructure financing & cost recovery – Efficiency improvements <ul style="list-style-type: none"> – In water use (subsidies for technology improvements) – In water allocation – phasing-out of low value uses
	Development of participatory processes	<ul style="list-style-type: none"> – Means for conflict resolution – Means for allocation of water between competitive uses/users – Public information organizations on local WM issues
River Basin Management and Groundwater Management	Public subsidies vs. economic efficiency for low-value uses	
	Enforcement of groundwater abstraction metering vs. user group opposition	
	Community management (bottom-up) vs. centralized management (top-down)	Feasibility, capacity, financing
Urban water management/Pollution prevention and control	Competitiveness vs. environmental protection	Incentives towards cleaner production in the industrial sector Incentives/disincentives to excessive agrochemical use
	Strengthening the participation in voluntary programmes	Incentives, user awareness, consumer awareness
	Sustainability of urban water services	Funding, cost recovery, affordability and access Community management in rural areas

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- AquaStress IP. Mitigation of Water Stress through new Approaches to Integrating Management, Technical, Economic and Institutional Instruments <http://www.aquastress.net>
- GEWAMED, “Mainstreaming Gender Dimension Into Water Resources Development and Management in the Mediterranean Region”, <http://www.gewamed.net>