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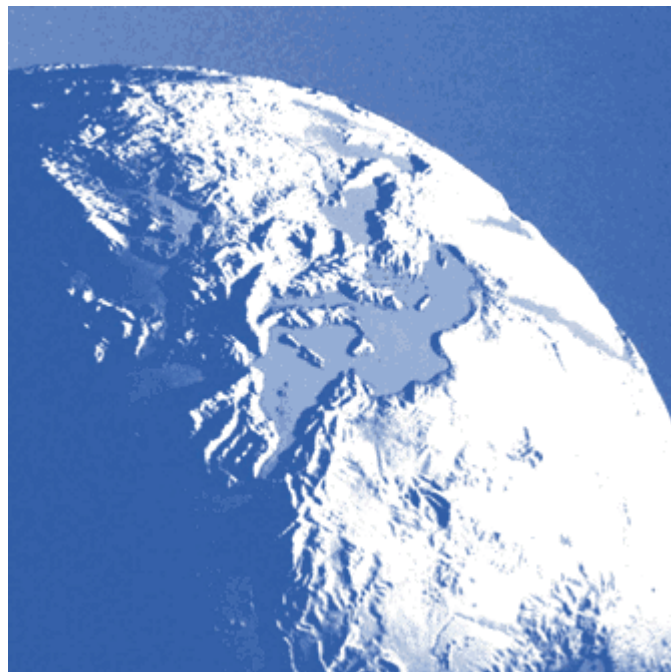
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The role of formal and informal institutions in the water sector

What are the challenges for development?

By Eugenia Ferragina, Mita Marra and Desiree A.L. Quagliarotti



Plan Bleu
Regional Activity
Center

Sophia Antipolis,
July 2002

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INTRODUCTION

Do institutions play a role in water development? Is water policy making affected by how the administrative system is organized and how human resources are managed? These questions have received different answers in different phases of academic and political debate. The theoretical literature elaborating the gains possible from institutional changes – both in the general and in the water sector contexts – are vast and growing also for sector-specific issues. In the late 1970s and early 1980s the message of new institutionalism was put to the forefront: that institutions in general and state institutions in particular are important for and make a difference to the collective choice processes. New institutionalists assume that administrative systems influence society and overall the environment, where relationships between citizens, private agents, and public organisations unfold.

The new thinking on the importance of institutions has influenced a new policy agenda, including a water policy. Development projects of the 1960s and 1970s were primarily directed towards the provision of physical assets, in efforts to increase productive capacity through industrialization and the provision of basic infrastructure. Traditionally, the water sector was a resource-intensive sector, dominated by engineering concerns. The emphasis was on the construction of physical facilities such as water distribution networks and treatment plants. In the past there was given little attention to the institutional and managerial aspects related to operating and using the facilities. Irrigation systems, for example, were often constructed and handed over without even an instruction manual being prepared, much less any training for the operators who then assumed the responsibility for it, nor was there institutional arrangements for their organisation. Throughout the 1980s and 1990s there was a growing concern that in many cases such projects had not been wholly successful, and that they had not often yielded the benefits that were intended for them. Increasingly, over the past decade, many programs in the water sector have begun to be primarily focused on developing institutional and human capacity rather than physical infrastructure. The result of this trend has been an attempt by those working in the sector to understand the institutional aspects related to water management. Coming up with the following policy suggestions:

- the creation of an enabling environment, with appropriate policy and legal frameworks;
- the promotion of institutional development, community participation, and the strengthening of managerial systems; and
- the focus on performance.

The contribution of these three elements to institution building has now become generally accepted within the sector, which is undergoing remarkable changes. Although both the nature and direction of these institutional changes vary by country specific economic, political, and resource realities, there are clearly identifiable trends and patterns. To unravel these trends and patterns of change at the international level it is necessary to address the following questions; what are the key factors that have motivated these institutional changes? What are the nature and direction of these changes? How adequate are these changes for addressing both the existing and emerging water sector challenges? What do they ultimately mean for overall water sector performance? It is possible to use cross-countries experiences to derive a workable agenda for institutional change, especially for countries that are on the threshold of water sector reform? The answers to these and related questions help in understanding the water sector problems and in delineating the contours of ongoing institutional responses.

This report will look at the way the water sector and policies are structured in a number of Middle Eastern countries to understand how their respective administrative systems have dealt with institutional priorities and problems. A central question in all of this is to what extent institutions provide opportunities for water sector development. For instance, the logic of privatization and regulation has pervaded the debate upon how to construct an efficient and effective management system for water supply and demand. How far have these policies proceeded in countries like

Jordan, Israel and Morocco? To what extent did administrative institutions affect this process, either as stimulus or brake? How is the role and significance of administrative institutions in all of this to be described and explained? New institutionalists assert that administrative institutions are an important factor, but what exactly is this factor? In what way does this factor make itself felt in water-related policy making? These and similar questions are central to this paper, which aims, through comparative empirical research, to contribute to the policy-oriented debate on the importance of institutions for water development.

METHODOLOGY

This study follows the Comparable Cases Strategy. The comparative methodology is intensive (focused on rationales) rather than extensive (focused on statistical significance) in nature. Extensive policy research is usually restricted to policy inputs and outputs while the process itself is treated as if it were a 'black box'. Intensive policy research strongly concentrates on the specific processes taking place within the black box. A potential drawback of the process-tracing procedure is the amount of information it requires. However the Comparable Cases Strategy can lighten the load. In this strategy one looks for cases that are similar to the greatest possible extent to enable counterfactual arguments. Comparative research into the significance of the institutional factors in the cases from Jordan, Israel, West Bank, and Morocco are aided by the fact that intensive, long-term and relatively high-quality research into the political administrative relations has been done by a considerable number of social scientists (Le Moigne, et al, 1992; Saleth, Dinar, 1999).

ORGANISATION OF THE REPORT

After this introduction, the paper is divided into two parts, in which theoretical and empirical arguments are intertwined. Theory serves to frame discourse that is then informed by empirical evidence and concrete examples. Such empirical routes will illustrate the practical implications of theoretical models on institutions.

The first part addresses the overall theme of the "rules of the game" and goes deeper into the issues of enabling conditions; legal and regulatory framework and institutional environment that specifically feature the water sector.

The second part purpose is to explore the links between institutional capacity and water sector performance using the concept of the country's social adaptive capacity.

PART 1: The rules of the game

1. THEORETICAL PREMISE

In spite of the resurgence of institutional analysis in the 1990s, the starting point goes further back. The works of Weber, Polanyi, Gerschenkron, Braudel, and Hirschman are the places to start. Polanyi (1957) provides a keen insight into the degree to which the markets depend on state action. Weber (1968) offers a powerful hypothesis as to what kind of internal organisation is likely to give States the capacity to construct markets and promote growth. Gerschenkron (1962) and Hirschman (1958) make it clear that state-society relations, particularly those that link states and entrepreneurial elites, are as important as markets. Braudel (1980) brings in the long term historical relationships, and point to the increasing sophistication and globalisation of the market mechanisms. More recently Evans (1995) advances a sociological theory on how economically undeveloped states successfully industrialise. Evans asserts that the more state agencies approximate Weber's ideal type bureaucracy (e.g., insulation from external interference, a merit based system of recruiting experts, an ample security and reward system) the more they can successfully spur economic development. Also Putnam (1989) provides a rich exposure of institutions that sustain democratic development, including the institutions of civil society.

According to March and Olsen, institutions constitute connections, channels, and gates of entry, which influence the outcome of problem definitions, policy options, and concepts embraced by various actors and organisations in the public domain. At a macro-level national political systems may be conceived as political opportunity structures that unfold into three sets of institutional factors:

- the formal institutional structure: distinguishing 'strong states' from 'weak states'; the strategic opportunities for water sector agents are assumed to be directly proportional to the power of the output structure of the state: the more efficient the state structure is, the better the opportunities to develop more sound water management systems (Migdal, 1988);
- the informal procedures and standards strategies: inclusive institutions offer water users and citizens more opportunities for participation than exclusive institutions, but at the same time inclusive institutions pose a risk of encapsulation;
- the political configuration of power.

It is unfortunate that the analysis of institutional opportunity structures is confined to other policies and social issues rather than the water sector, which for instance has to take account of a political opportunity structure for more equitable distribution of water resources and management. Yet, institutions can be seen not only as channels that carry policy options, but also as restrictions, or barriers to policy processes. The barriers, over which potential conflicts may arise, as far as water resource allocation and utilization, can be distinguished into three types (Bachrach and Baratz, 1970). First, social or administrative institutions that prevent citizens' participation and voice can block the translation of social wants into demands. Second, the conversion of demands into issues can be hampered by organisations, procedures, routines, that form the agenda setting process. Third, what institutionalized constraints mean to particular groups and actors: who wins and who loses because of institutional barriers within the water sector? Institutions also give weight and clout to cultures in the policy making process. Institutions distribute resources, which may strengthen or weaken the power position of particular actors and organisations.

Two research traditions stand out. The first tradition associates policy making power with the possession of resources such as legal competences, financial means, and policy-relevant information. In every institutional system these resources are unevenly distributed, but not in the same way. For

instance, when water becomes scarce, even for a short period (e.g., seasonal drought in Mediterranean countries) the quantitative limits and the unitary nature results in growing conflicts among users. The increasing supply-demand gap intensifies conflicts within regions and economic sectors demonstrate the inherent limitations of the existing institutions dealing with resource allocation and management. Allocation and conflict resolution mechanisms have to be either created or strengthened both in the legal and policy spheres.

The second research tradition is not so much focused on the possession of resources as on the strategic use of resources, and more importantly on the perceptions of those who are involved in the strategic use of resources. Power is not an objectively assessable fact, but a subjectively perceived relation of dependence. Institutions fix “the rules of the game” these rules constrain the players, but at the same time they are being constructed, reconstructed and strategically interpreted by the players (Crozier and Friedberg, 1980). For instance, significant benefits accrue from user participation in the planning, implementation, operation and maintenance of water works. First, it achieves broad based support for water policy implementation in the community and command area, and generates active interest in its operation and maintenance. Second, it reduces the financial and managerial burden on the government as users take on responsibility of managing a considerable part of the operations and pay for the services they consider their own.

The two traditions are not necessarily exclusive but rather complement each other. For instance, water users have become important players during times of water scarcity. The water administration and water sector decision process now have to accommodate an increasing role of user organisations, non-governmental agencies, women, environmental, and other self-help groups. At the same time they have to explore the ways in which emerging water and information technologies can be gainfully utilized. Looking at the formal institutions one might think that the relationship between users and water governmental agencies or private providers is rather balanced. Taking the informal institutions (including the institutionalised reputation of power) into account as well, one would find that the hierarchical culture carries quite a lot of weight in the inter-regional policy-making system of the Middle East.

Next, we analyse the connection between policy, culture, and institutions specifically in the water sector across selected Mediterranean countries. In particular, as these countries show a recurrent state of water scarcity and crisis, water institutions, that define the rules of water development, allocation, and utilization, have to be reoriented to reflect the changing supply-demand and quantity-quality realities. Institutional re-orientation involving fundamental changes in the three interrelated dimensions of water institutions (i.e., water law, water policy, and water administration) though crucial is not an easy task. The main issue here is what explains these institutional changes and how these changes are interrelated. One of the key premises in institutional economics literature is that institutional change occurs only when its transaction costs are less than the corresponding opportunity costs. In the particular context of water institutions, transaction costs cover both the real and monetary costs of instituting the regulatory monitoring, and enforcement mechanisms needed for water resource development, allocation, and management. Similarly, the opportunity costs cover both the real and economic value of opportunities foregone or the net social loss due to “status quo”. With increasing water scarcity, the opportunity costs of status quo are indeed tremendous and quickly increasing to exceed the corresponding transaction costs.

2. THE CONCEPT OF INTEGRATED WATER RESOURCES MANAGEMENT AND THE DRIVING FORCES FOR INSTITUTIONAL INNOVATION IN MEDITERRANEAN COUNTRIES

“Integrated water resource management is a process, which promotes the coordinated development and management of water, land and related resources in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” (GWP, TAC 2000).

The “integrated” approach in water resource management is not a new concept. It was recommended at the 1977 United Nations Conference in Mar del Plata. The conference led to the declaration of the 1980s as the “water sanitation decade” with the objective of providing drinking water and sanitation for all by 1990. The concept has undergone a series of evolutions and refinements during numerous regional and international conferences (New Delhi in 1990, Delft in 1991, Dublin in January 1992 and Rio de Janeiro in June 1992). In its original form, Integrated Water Resource Management (IWRM) referred to the integration in purpose and development by different users, for example in a river basin. After the second inter-ministerial World Water Conference at The Hague (2000), it emerged that this basic approach was not enough and that a wider definition was required. The result of this long process is reflected in a new concept that embodies integration across sectors, integration of use, integration of demand, and integration with the environment.

In Mediterranean countries there are many obstacles to the implementation of such principles, the major ones are those related to the practical realities facing many governments. The institutional aspects are not adapted for integrated water management¹. The fragmentation of the institutional framework and the complex co-ordination mechanisms have been pointed out as characteristics in many countries of the Mediterranean.

Otherwise, the implementation of IWRM is under way in most countries. There are the Basin Authorities and advanced water laws in countries like Algeria, Libya, Morocco, France, Italy, Spain...and a mature system of Water User Associations that have been in place for more than a century in countries such as Tunisia and Spain. Problems seem to emerge from the effective functioning of these IWRM institutions, especially at the time of effective enforcement of water laws, related to the control of water use and pricing and environmental protection.

3. THE ENABLING ENVIRONMENT

Addressing the growing challenges associated with water resources management will require difficult changes to occur to existing institutions and policies governing water resources. Successful implementation of IWRM will require the establishment of a proper “enabling environment”.

The importance of an enabling environment is widely accepted among scholars and policy makers. It is essential to both ensure the rights and assets of all stakeholders and to protect public assets such as intrinsic environmental values. The enabling environment comprises of national, provincial and local policies and the legislation that constitute the “rules of the game”. This enables all stakeholders to play their respective roles in the development and management of water resources and also develops information and capacity building necessary to establish these “rules of the game” and to facilitate stakeholder participation (GWP, TAC 2000).

¹ Water institution is perceived here in its broadest sense of water law, water policy and organisational framework.

3.1. Legal and regulatory framework

Legislation provides the basis for government intervention and action and establishes the context and framework for action by non-governmental entities; hence it is an important element within the enabling environment.

In Mediterranean countries the essential traits of classical law were coded in the Ottoman civil code and, in countries influenced by France (e.g., Lebanon and the Maghreb) there has been a holistic and comprehensive approach to water sharing. In countries influenced by Britain (e.g. Egypt and Jordan), legislation has tended to be more piecemeal and, with growing water scarcity, less satisfactory.

State property of water is an original right, subject to varying recognition of community appropriation. Rights of companies and/or private individuals are therefore residual. State permits are generally required for private exploitation and the state is also responsible - either directly or through concession – for treatment, distribution, and major public works. Allocation and priorities are, however, often vaguely stated or are absent, and many uses, for instance instream and other environmental uses, have mostly been overlooked.

The more scarce water is - the more conflicts arise over water therefore, it is more important to have a coherent and comprehensive water law in place. Specific water laws have been enacted in a considerable number of countries, but some still lack a water resources law per se. Although references to water resources may be found in the national legislation, these are often dispersed in a multitude of sectorally oriented laws and may be contradictory or inconsistent on some aspects of water resource usage.

Legal reforms to improve access to water are needed in many countries. Water legislation should :

- be based on a stated national water policy that cuts across sectoral and stakeholder divisions, addresses water as a resource and stresses the societal priority for basic human needs and ecosystem protection;
- present a balanced approach between resource development for economic purposes and the protection of water quality, eco-systems and other public welfare benefits;
- secure water use rights to allow private and community investment and participation in water management;
- reduce the role of government, increasing the importance of local user groups.

3.2. Institutional capacity building

Chapter 18 of Agenda 21 states that capacity building is a prerequisite to IWRM. In this context, capacity building is the sum of efforts to nurture, enhance and utilize the skills and capabilities of human resources for the efficient functioning of water sector organisations and institutions.

The principal objective of capacity building for sustainable water resource management is to improve the quality of decision making and managerial performance in the planning and implementation of water sector programmes and projects (UNDP, 1998). The capacity building includes a process approach through innovative education and training with problem-solving workshops and real-life simulations, technical assistance, and networking and partnership arrangements to pool expertise.

Public water sector staff capability in Middle Eastern and North African countries varies considerably from country to country. Generally, water staff are trained as engineers and openings for those with other required disciplines are severely limited with few opportunities for promotion. The level of staff capability and motivation varies, but low salaries and benefits generally undermine morale and discourage adoption of modern technologies and management systems. It is particularly difficult to get qualified staff posted to important planning, design and research positions. As a

result, much of the planning is done by consultants and many countries do not have sufficient qualified interdisciplinary staff to review and comment on the work of consultants.

Box 1. Capacity Building for water management: the example of Irrigation Management System Project (IMS) in Egypt

IMS Goals:

- Effective control of Nile waters for all uses and particularly for their optimal allocation within agriculture as means of helping increase agricultural production.
- To improve the operation efficiency of the water distribution system for agricultural irrigation and for other water uses.
- Promote human resources development through the creation of :
 1. *Training Centre;*
 2. *On job training;*
 3. *Academic and non-Academic training;*
 4. *Study tours;*
 5. *Central NWRC Library;*
 6. *Computer Centre;*
 7. *National and International Seminars.*

IMS Purposes:

- Strengthen the capability and capacity to plan, design, and maintain the water distribution system.
- Plan, design, and construct an improved operationally efficient irrigation system in selected canal throughout the country.
- Further development and addition to the set of computer models and computer programs that are designed for planning, operation and management of the irrigation system.
- Implement the computer models design for operation of the irrigation system;
- An extensive research operation covering all aspects of irrigation development and management.

No doubt the impact of the IMS project is obvious on water management in Egypt.

Source: CIHEAM, 1999.

4. INSTITUTIONAL STRUCTURE AND WATER MANAGEMENT

The fragmentation of the institutional framework and the complexity of coordination mechanisms are two major characteristics of water management institutions in the Mediterranean countries. Historically, most public water agencies were established to meet a specific need, generally focusing on a single use; thus a country may typically have ministries or departments dealing with irrigation, agriculture, fisheries and wildlife, transport, energy, environment, health and human resources, and so on, each involved with one aspect of water use.

A distinction has to be made between the EU countries and the MENA countries. EU countries are seeking a better institutional framework through processes such as “deconcentration”, decentralisation and management at the river basin level. In the MENA countries, the institutional structure is highly centralised. Nevertheless, deconcentration of the central agencies and decentralised management of the operation and maintenance of irrigation structures have been emerging issues in those countries (Kroll, 2002).

The institutional framework of responsibilities in water management needs to change. Three key issues arise here:

- reducing fragmentation caused by responsibilities being split between different government agencies;
- improving the effectiveness of water management institutions;

- increasing participation of local communities, civil society, local government and the private sector (WWAP, 2001).

The issues involved are complex and country specific, but they can be usefully considered in relation to:

- management of the resource;
- the provision of water services.

Management of the resource typically involves policy development, supply planning, allocation, permit administration, and environmental management, and is predominantly a government function. However, this should not preclude private participation, nor does it imply that all functions should be concentrated at the centre. Indeed, as a general principle, functions should not be exercised at a higher level if they can be better exercised at a lower level.

Delivery of water services involves the wholesaling of water to intermediaries and the retail distribution of water to end-users. Delivery of water services can be either a public or a private function and, as in the case of resource management, should be delegated to lower levels and local entities. Whether in the private or public sectors, delivery of service is usually best assigned to autonomous agencies that deliver specific services for a fee.

In this section, we consider several key aspects of institutional structure and operation, including the role of government, regional and basin entities, local level management, and the role of the private sector in the delivery of water services.

4.1. Resource management

Water management can be considered at the national, regional, basin and local levels. At each level, the logical management of water as a unitary resource that requires functional links with agency responsibilities for:

- water and associated land use;
- surface and subsurface water, and
- water quantity and quality.

In practice, agency responsibilities are often fragmented and associated with the user or interest that had a predominant role at previous stages of development. Consolidation of responsibilities in a holistic resource management structure, thus often conflicts with existing vested interests. Three general principles are highly desirable in assigning responsibilities for management of the unified resource:

- separation of policy, planning, and regulatory functions from operational activities at each level of government;
- assignment of operations to specialist agencies where appropriate;
- decentralisation of functional responsibility to the appropriate level.

CENTRALISED POLICY AND PLANNING MECHANISMS

Many countries have established centralised mechanisms for policy and planning. Typically, overall control and co-ordination are exercised by a council, comprising of senior officials from different ministries and departments involved in aspects of water, supported by a professional secretariat. The council may be chaired at the highest level of government (for instance, in Morocco by the King), reflecting the political importance of water and the high priority attached to water issues by many Middle East and North Africa (MENA) governments.

The creation of centralised policy and planning mechanisms is a logical and necessary step for comprehensive and coordinated management of unitary water resources. In practice, however,

such centralised arrangements are frequently underfinanced, understaffed and may lack real operational authority. This lack of success should not, however, negate the essential justification of coordinated resource planning. Not only should national planning mechanisms be above sectoral agencies, but there must also be commitment and authority to formulate policy and to ensure that water programs and projects are in practice consistent with national policies and plans.

Tunisia and Israel are examples of countries that have benefited from effective centralised institutions arrangements supported by water sector master planning. While there have still been biases, for instance in Israel the Ministry of Agriculture has been predominant in water matters, this has contributed to rational investment decisions, relatively efficient management of the resource, and effective assistance programs. In contrast, despite master planning activities (e.g., in Egypt), or the creation of high-level policy councils, in many other countries the will to make hard choices has been lacking and major avoidable costs have undoubtedly been incurred.

DECENTRALISED POLICY AND PLANNING MECHANISMS

Water flows according to natural characteristics and does not respect administrative boundaries. From a pure water resource point of view there might be much logic in adopting a river basin approach, or at least considering the river basin as the logical planning unit.

A river basin can be defined by the watershed limit of a system of waters, both ground and surface, flowing to a common terminus. River Basin Management (RBM) integrates this system of waters within its broader natural environment and its social, economic, and political contexts. Basin units cut across administrative divisions that typically have caused problems in reaching an integrated management of water resources.

As river basin approach reaches full utilization, systems of specifying, quantifying, and assigning rights to the water become more formalized. Those affected try to protect, defend, and perhaps augment their rights; interact with other right holders and sometimes conflict with them.

RBM must, therefore, establish the “rules of the game” and mechanisms to govern these interactions, so that they take place in a productive and efficient way. All private interests and stakeholders in the water affairs of the basin must have suitable protection and adequate representation, including the natural environment and less powerful water users.

River basin organisations may also provide a useful mechanism for management of inter-national water resources. There are numerous examples of such bodies, with varying objectives and functions from around the world, which suggests that they may contribute to the peaceful, equitable and negotiated management of shared water.

There are two archetypal organisational models for implementing RBM: the authority model, in which a single unified organisation is empowered to make decisions; the coordinative model, in which existing administrative units work together to cover an entire river basin or sub-basin. These two models represent polar extremes. Specific cases often blend the two.

Most examples of RBM are from the higher-income countries. Achieving effective basin management requires a strong knowledge base, suitable governance mechanisms, administrative capacity, adequate stakeholder representation, transparency, and political will (IFPRI, 2001).

Many countries in the Mediterranean basin have decentralised water resource management functions to regional or river basin authorities. These arrangements have had mixed success. Such entities are often relatively well financed and well staffed, and are often assigned the authority to plan and implement multipurpose projects and programs within their jurisdictions.

Box 2. River basin management in France

A law in December 1964 divided the whole territory of France among six Water Agencies, their spatial limits following hydrological divisions. The French experience with this system suggests that three elements are essential for the success of an active organisation:

- a *conscience*, embodied in the staff and responsible for the collection and assessment of water resources information in the basin, facilitation of co-ordination and negotiation between stakeholders, preparation of plans and proposals for investment and collection of fees for water use and wastewater discharge;
- a *forum* for all stakeholders to discuss and make actual decisions on water resources issues, acting as a kind of “water parliament” for the river basin. Its responsibility is to supervise the “conscience”, to discuss, modify and approve its proposals. The forum should also approve the budget of the river basin organisation. Central government should participate in the forum and the national parliament be informed of the river basin organisation activities, in order to ensure the necessary links with national policies;
- a *budget* to sustain the organisation, and to finance the necessary operations and investments in water-related infrastructure. The budget might be based on charges for water use and wastewater disposal. The river basin organisation may encourage sustainable water use by allocating loans and grants to cities, industries or individuals willing to invest in facilities that contribute to the overall goals of integrated water resource management in the basin. Hence, there is a direct link between what is charged for water and what is invested in water.

Each Agency has the following duties:

- establish five years water management investment programs;
- collect fees for each cubic metre of water abstracted from the natural water resource and for each ton of waste discharged into the natural water resource;
- issue grants or low-interest loans to all actors (cities, industries, etc.) who contribute to the implementation of the five-year program. Expenses and revenues have to be in balance over this five-year program (GWP, 2000).

4.2. Delivery of water services

Delivery of water services includes wholesale conveyance and transfer of raw water as well as retail delivery to households, industries, farms and other end-users. Experience worldwide has shown that measurable economic services – delivery of raw water supplies, domestic water supply and sewerage, irrigation, power – are best provided by autonomous entities organized as utilities delivering defined services to costumers for a fee. It can be a national agency, local government entity, user association or private company.

Delivery of water services in Mediterranean countries has predominantly been undertaken by public agencies. However, emphasis on private participation has grown worldwide, and private sector involvement is warranted, especially in the operation of water and sewerage utilities. In contrast to the urban sector, there are few opportunities for private commercial involvement in the provision of irrigation services, though there is a long history of schemes managed by farmers in the region (e.g. in Morocco), it is possible to envisage the long-term transformation of autonomous public bodies into private entities managed by users along commercial lines in a manner comparable to the irrigation districts typical of many developed countries.

Box 3. Water resources management and delivery of water services in Morocco

Although provincial governments are gaining importance since the democratisation process started in the 1960s, Morocco remains still highly centralised. In contrast water administration shows considerable decentralisation and functional specialization. The Directorate General for Hydraulics under the Ministry of Equipment (MOE) plans and develops water resources. The National Office of Potable Water, again under MOE, acquires and distributes water, not only on a retail basis to household and industries in major urban centres, but also on a bulk supply basis to municipal/provincial governments. The nine Regional Authorities for Agricultural Development (RAADs), under the Ministry of Agriculture (MOA), develop and maintain water distribution networks, acquire and distribute water, collect water charges and provide farm inputs and extension services. In smaller systems including groundwater areas, on the other hand, local governments and farmers play a stronger role in water distribution and system maintenance.

The new Water Code of 1995 has led to significant changes both in the spheres of water policy and water administration. The law makes the Supreme Water Council (involving all major water sector stakeholders) the key agency for water policy at the national level and River Basin Organisation (covering one or more RAADs) the main agency for water administration at the regional level (the first RBO was created in 1997). The National Water Plan and Basin Water Plans are to provide technical framework for formulating both national and regional strategies for water management. (Saleth R. and Dinar A., 1999)

COMMUNITY PARTICIPATION

Poor experiences of large-scale irrigation managed by centralised organisations worldwide have prompted many countries to investigate the potential for increasing water user associations (WUAs) as a means of increasing responsibility, improving efficiency and reducing costs.

There are considerable differences in the irrigation associations of the countries where they are institutionalised and even within a given country. Authors choose different criteria to group them, such as size of membership, financial responsibilities and voluntary/compulsory formation. The criterion chosen in this text is the financial responsibility with regard to the repayment of the investments made in the irrigation infrastructure. Two main groups can be differentiated:

- user associations bearing responsibility for not repayment of the hydraulic works, their maintenance and the distribution of the water to the farmers. These groups are generically designated as “modern associations”;
- user associations with their main responsibility being the distribution of water among the farmers. Eventually, the maintenance of canals within the boundaries of the area managed by the associations can also be their responsibility. These associations are generically designated as “traditional associations”.

Modern user associations have important financial responsibilities; they include, generally: repayment of the loan for the execution of the works, operation and maintenance costs, establishment of a reserve fund and administrative costs. These costs are normally recovered from the members of the association by way of taxes and/or fees imposed on the land and/or the water.

Traditional user associations have much less financial responsibility because, one way or another, the irrigation work has been amortized in the past. Their responsibilities are generally limited to some maintenance work, which is often undertaken as communal work. In other cases, where operation and maintenance is undertaken by the board of directors, farmers are liable for the payment of the corresponding cost (FAO, 1986).

The theoretical advantages of WUAs are:

- reduced Government expenditure;
- improved system performance;
- sustainability;
- equity; and
- spillover effects from improved social and economic organisation.

In order to establish WUAs it is necessary to have a legal framework that allows for an appropriate institutional status². Experience with WUAs worldwide shows that the idea can only work if Government has a clear mind and objectives, users are convinced and are empowered, and training is given.

In the EU countries, WUAs have a very long tradition in water management. For many years, irrigators have created associations and have managed irrigation systems autonomously. Despite their undefined legal status and their authority based on custom, the WUAs are very autonomous. The WUAs collect water tariffs, organise irrigation procedures, control the application of rules, establish sanctions and deal with the operation and maintenance of the irrigation systems. In the MENA countries, the establishment of the WUAs is generally recent, dating from the mid-1990's (Kroll, 2002).

Box 4. Participatory irrigation management in Spain

In Spain on 13 June 1879 the most complete Water Law was enacted with 258 articles, out of which 25 concerned irrigators' communities. After 106 years of this law's enforcement, the new (and present) Water Act was promulgated on 2 August 1985 with 113 articles. The 1985 Act contains 11 articles referring to users' communities and thus establishes the legal norms these communities have to observe, and specifies their rights and duties.

Irrigators' communities are corporations in Public Right ascribed to the Basin Agency in the valleys where they are located. They have internal autonomy in terms of management, within the limits specified in law through individual ordinances and regulations, drafted by the irrigators themselves and submitted for final approval to their respective Basin Agency. The authority that the Water Act confers on irrigators' communities clearly endorses the importance of these institutions. However, the influence that irrigators' communities have within the State Basin Agencies is not always reflected in administrative decisions, nor is it evidenced in public opinion. So, what is an irrigators' community? It is best defined as "a specific area, suitable for irrigation, enjoying a water concession to being irrigated". This definition highlights that the water concession is linked to the land and not a grant to the land-owner or "commoner". Accordingly, when a commoner sells his field, he transfers, along with the land, the relevant right to the water that cannot be sold separately, for it does not belong to him. Irrigators' communities have the obligation to administer collectively the surface and underground waters they share. Their main task is the distribution and regulation of the water allocated to them, observing the norms approved by Public Authority and elaborated by the users themselves. (del Campo, Garcia, 1999).

Box 5. Participatory irrigation management in Turkey

In Turkey, the transfer of irrigation systems to users started in the early 1950's. It continued at a slow pace until 1993, each year small schemes were gradually transferred to users with an average annual area of about 2,000 ha. State Hydraulic Works (DSI) was also encouraging the participatory approach through establishing Irrigation Groups (IGs) or Water User Groups (WUGs) with limited responsibility for Operation and Maintenance (O&M). As a result, by the end of 1993 about 6,00, 000 ha were managed by such IGs jointly with DSI. Before 1993, the DSI focus was on transferring only small and isolated schemes. This policy on transferring irrigation schemes was guided primarily by the concern that it was difficult and uneconomical for DSI to manage such schemes. However, since 1993, DSI's policy has shifted from transferring only small and isolated schemes to an accelerated approach of transferring large schemes as well as small and isolated schemes.

The main benefits to the State from transfer are:

1. to remove the O&M financial burden from DSI and thus from the government.
2. farmers feeling a sense of ownership in transferred schemes have resulted in a better protection of the irrigation infrastructure.
3. Water User Organisation (WUOs) have generally demonstrated the ability to operate and maintain the systems satisfactorily through recruiting required staff, buying urgently needed transportation and communication equipment, assessing and collecting water fees, equipping their offices and substantially improving water delivery at a cost generally less than that incurred before.

A general assessment of performance of transferred schemes shows that the transferred schemes continue to perform satisfactorily and contribute to increased production in irrigated areas (Uskey, 2000).

² In many countries this has formed part of a comprehensive water law – e.g. Mexico, Madagascar, Albania, Nepal. In other countries there is a special users association law.

PRIVATE SECTOR PARTICIPATION

One of the most important and controversial trends in the global water arena is the accelerating transfer of the production, distribution, or management of water or water services from public entities into private hands – a process loosely called “privatisation.”

Treating water as an economic good, and privatising water systems, is not a new idea³. Private entrepreneurs, investor-owned utilities, or other market tools have for a long time provided water or water services in different parts of the world. What is new is the extent of privatisation efforts underway today, and the growing public awareness, and attention, to problems associated with these efforts.

As a measure of the new importance of privatisation, the second World Water Forum in the Hague in March 2000 gave special emphasis to the need to mobilize new financial resources to solve water problems and called for greater involvement by the private sector. In addition, the World Bank, other international aid agencies, and some water organisations like the World Water Council are increasingly pushing privatisation in their efforts, but they lack a common set of guidelines and principles.

Traditionally, the provision of water supply and sanitation services in developing countries has been the responsibility of national and municipal governments. Substantial private sector involvement was considered inappropriate for five important characteristics of the water and sanitation sector (Rees, 1997):

- the natural monopoly that characterises the water sector and the lack of substitute products;
- the public and merit goods supplied by the sector;
- the crucial relationship between water infrastructure and urban/economic development;
- the highly capital-intensive nature of the sector and the over-whelming presence of sunker-costs, which increase private-sector risks;
- the multi-purpose and hydrologically interconnected nature of the water resource itself.

One key factor driving the promotion of private sector participation is the sheer inability of governments to finance the raising capital, operation and maintenance costs of municipal water systems⁴ (Thompson, 2001). It is also difficult for government officials, subject to political processes to raise water prices; privatisation permits governments to give that problem to private entities (Yergin and Stanislaw, 1999). The motivation to embrace private sector participation has also been driven by a belief that the private sector providers may be more efficient than their public sector counterparts, thus reducing costs and increasing service quality and coverage (Shambaugh, 1999).

However, there are no guarantees that privatisation will actually yield the desired performance improvements. Simply converting a public sector monopoly into a private one provides no competitive incentives for the utility to operate efficiently, make appropriate investments or

³ Private involvement in water supply has a long history. Indeed, in some places, private ownership and provision of water was the norm, until governments began to assume these responsibilities. In the United States, municipal services were often provided by private organizations in the early 1800s.

Toward the latter half of that century, municipalities started to confront problems with access and service and began a transition toward public control and management. In particular, private companies were failing to provide access to all citizens in an equitable manner. Private water companies provided 94 percent of the U.S. market in the 19th century, dropping to only 15 percent by 2000 (Beecher et al. 1995).

In 19th century France, the trend moved in the opposite direction: municipalities that previously had responsibility for providing water services began to contract services to private operators. Over the years, these operators expanded beyond the borders of France and as a result, they now have a dominant position in much of the world in providing private water services.

Major international efforts to privatize water systems and markets are still a relatively recent phenomenon, with major transfers taking place only over the past ten to fifteen years.

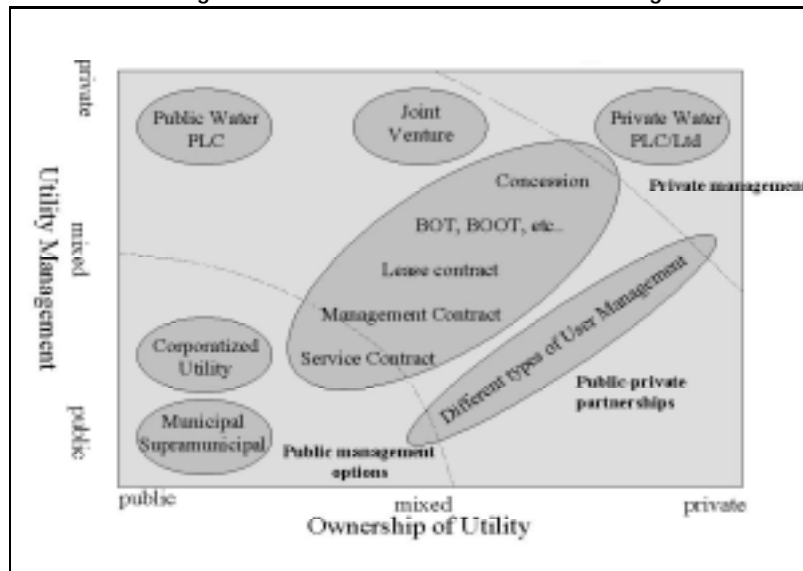
By the end of 2000, at least 93 countries had partially privatized water or wastewater services (Brubaker 2001), including Argentina, Chile, China, Colombia, the Philippines, South Africa, Australia, the United Kingdom, and Central Europe, but less than ten percent of all water is currently managed by the private sector (LeClerc and Raes 2001).

⁴ The World Bank estimates that countries need to invest US\$600 billion in water infrastructure in the next decade alone. In the majority of developing countries, rapidly growing populations, a reduction in assistance for water supply and sanitation from international agencies and severely constrained public sources of finance have all contributed to making it increasingly difficult for governments to bear the costs of system rehabilitation and expansion.

respond to consumer demands⁵. Likewise, privatisation per se need do little to improve sector performance if governments are unwilling or unable to tackle such underlying problems as over-manning, uneconomic water pricing policies, financing the provision of public and merit goods, and restricting over-intrusive political intervention.

The privatisation of water encompasses an enormous variety of possible water-management arrangements (Figure 1). On the right-hand side of the figure, we find various gradations of Public-Private Partnerships, where an increasing number of tasks are delegated to private firms. Privatisation can be partial, leading to so-called public/private partnerships, or complete, leading to the total elimination of government responsibility for water systems. Only the most complete transfers full ownership and operation of water systems to the private sector. Much more common are forms that leave public ownership of water resources unaffected and include transferring some operational responsibilities for water supply or wastewater management from the public to the private sector⁶.

Figure 1. Basic Modes of Water Sector Organisation



Source: 2nd World Water Forum, 17-22 March 2000, The Hague

The allocation of responsibilities (ownership, investment, operation and tariff collection) in alternative Public-Private Partnerships is presented in Table 2. Decision on the form and scope of private sector participation option should be made on a case by case basis taking into account the enabling environment and the specificity of the country, sector and project concerned. While concessions should be considered as very suitable to achieve the aim of improving performance and mobilizing finance, however, a sound and transparent regulatory framework, good information about assets and historical financial performance, as well as cost-covering tariffs are prerequisites for successful concessions.

Private sector participation is a relatively new trend in developing countries, and in the MENA region in particular. While some public water and sanitation utilities - such as in Tunisia and the Jerusalem Water Undertaking in the Ramallah area of the West Bank - have performed relatively well from the beginning, there are no example of a public water utility in the region whose

⁵ In the United Kingdom a range of performance studies have all concluded that there is no automatic relationship between privatisation and productivity improvements (Rees, 1997).

⁶ It is the French pattern that is now being promoted around the world. But the impetus for change has come from United Kingdom. The fashion for "privatisation" in all things started there in the early 1890, and although unpopular, reached the water sector in 1989. One notable advisor strongly recommended the French approach to the British government, that is, retaining the fixed assets in government ownership. But it was rejected in order to remove the future funding requirements from the Public Sector. So the entire industry was sold off to private stakeholders, a divestiture.

performance has improved significantly and where this improvement has been sustained (Saghir, et al., 2000). Equitable allocation and efficient management of water resources are critical to peace and political stability in the MENA region. Some MENA countries have realized that part of the solution in a regional context characterized by water scarcity relies upon private sector participation in water service management and the pricing reforms associated with it. The most ambitious private participation program in water and sanitation in the region has been initiated by Morocco. Moreover, the World Bank supported management contracts in Gaza in 1996, as well as in Hebron/Bethlehem in 1999. Some other countries, are considering options that involve the private sector in water and waste-water resources management: in Tunisia, ONAS is considering a Build Operate and Transfer (BOT) formula for wastewater treatment plants; in Lebanon, the Litani River authority and the authority in charge of water are willing to involve the private sector in any major investment in the water sector. Desalination projects that are currently operational in the region mostly rely on Private Sector Participation.

Table 1. The allocation of responsibilities in alternative Public-Private Partnerships

Option	Responsibilities							
	Asset ownership	Operations and maintenance	Capital investment	Commercial risk	Scope of contract	Tariff collection	Duration	Examples
.4.2...1 Service Contract	Public	Public and private	Public	Public	Metre reading, collection of bills leak repairs etc.	Publ./priv	1-2 years	Chile, India, Mexico
Management Contract	Public	Private	Public	Public	Full system	Publ./priv	3-5 years	Gaza, Amman, Bethlehem/Hebron, Trinidad
Lease	Public	Private	Public	Shared	Full system	Private	8-15 years	Guinea, Senegal Poland
BOT/BOOT	Private	Private	Private	Private	Bulk supply, wastewater treatment plants	Public	20-30 years	Malaysia, Australia, Mexico, Brazil, Chile, New Zealand
Concession	Publ./priv	Private	Private	Private	Full system	Private	25-30 years	Argentina, Ivory Coast, Philippines Rabat, Casablanca
Divestiture	Private	Private	Private	Private	Full system	Private	Indefinite	England, Wales

Source: Based on: Coyaud (1988), Haarmeyer and Mody and Johnston et al. (1999).

Box 6. Morocco

The establishment of a framework for privatisation is preceeding in Morocco. This process is expected to include the transformation of selected public agencies into financially autonomous entities. The Government is also committed to the encouraging of management contracts for service delivery. These steps are expected to improve incentives for cost recovery, service provision and stakeholder participation. They require as a precursor the establishment of a regulatory framework to set and enforce environmental and other standards and to prevent, through performance accountability and other safeguards, monopoly pricing and deterioration in services. Actually, only parts of the potable water distribution system are ready for some forms of privatisation, but over time improved financial and managerial autonomy may be anticipated to widen the scope and depth of the private sector in water resources management. And, it should be noted that even where entire agencies or institutions are not easily privatised, specific services and functions, might be. Indeed, this is already the case. For example, the DGH sub-contracts the environmental analysis of certain water samples to private laboratories (World Bank, 1995).

Box 7. Jordan

Jordan has taken a major step with the privatisation of water supply in Amman through the setting-up of a company (LEMA) shared with ONDEO, Montgomery Watson and Arabtech Jardaneh. Under this management contract, a private company has been made responsible for the operation of the water supply and sanitation system in the Amman governorate under a 4-year contract. The operator collects bills, employs staff, but does not invest in the system; remuneration is through a base fee and a portion of incremental profits earned, thus providing an incentive to improve performance. Early results are already positive. The initial reform needs to be broadened (to other cities) and deepened through further intensive work in Amman.

Another example of the involvement of private sector in water management is the BOT formula for the financing of the Disi project. The Disi-Amman conveyance system will have a length of 325 kilometer and a cost of about 600 million US dollars. A private consortium will provide the financing, the planning, the implementation, the management and the maintenance for a forty-year period. To reduce the final price of water for Jordanian users a mixed formula has been adopted that foresee a state contribution of about 200 million US dollars to integrate the private investment (World Bank, 2001).

PART 2: Institutional framework and water sector performance

1. SOCIAL ADAPTIVE CAPACITY TO WATER SCARCITY: THE IMPORTANCE OF INSTITUTIONAL DEVELOPMENT IN WATER RESOURCES MANAGEMENT

Classic economic theory is based on the possibility of making rational choices. Such choices, however, entail complete market transparency and the possession of information by moving forces in the economy, conditions that are unlikely to be achieved in a real context. The lack of transparency in the market is responsible for what are defined as costs of transaction, since actors tend to guard their interests against problems such as moral hazards and rent seeking (North, 1990).

An asymmetrical distribution of power in accessing water resources and a lack of market transparency lead individual players and social groups to adopt ways with which to maximise the satisfaction of individual needs, without any consideration for the lack of resources available, consequently leading to the depletion of water resources (Amendola, Autiero, 1998). The availability of information is fundamental in encouraging an efficient use of resources, in so far as consumers should know the cost of water, the quantity necessary for different crops, the increase in crops resulting from irrigation etc...

In short, the market by itself is not in a position to ensure efficient allocation of water resources without suitable institution intervention. Such interventions are essential considering the special nature of water as a commodity, which presents characteristics such as non-exclusion from consumption, interdependence in its use and spatial and temporal variability, which make its regulation a necessity (Dasgupta, 1996).

Economic science has tried to quantify the value of natural resources, in an attempt to elaborate a real environmental account and to assess the costs associated with the deterioration of environmental capital and the consequences for future generations. Some economists have identified a so-called "precautionary" principle which would impose that the stock of natural resources remains unaltered in time (Pearce and Turner, 1990. Turner, 1993). In reality, such a precautionary principle has been applied to an extremely limited extent: except for several traditional methods of water management, able to maintain a balance, though precarious, between populations and available water resources.

An interesting contribution on the links existing between economic development and protection of environmental capital comes from Allan and Karshenas (Allan, Karshenas 1996). Economic growth is, according to these authors, a key factor in reducing the exploitation of environmental capital, in that only an economy which is strong and sufficiently varied within its environment can allocate water to more productive use and reconcile economic efficiency with protecting environmental capital. It is possible, then, to identify phases in the use of water resources corresponding to different paths of development.

In the first phase of development (take off) environmental capital is used to develop an economic system and increase the wealth of a population. Later on, technological development opens new possibilities for managing the environmental capital – i.e. the increase in productive efficiency associated with the improvement in irrigation methods and the reduction of water losses. With the strengthening and diversification of the economic structure, the importance of the agricultural sector, in terms of employment and contribution to the Gross National Product, is reduced and it becomes possible to allocate water towards more productive uses. Introducing principles of allocative efficiency entails less pressure on water resources and creates conditions for what the authors describe as "the reconstruction of environmental capital".

The theory of Allan and Karshenas makes it possible to overturn an argument that often sees water as a key element in socio-economic development, while it appears from the evolution of industrialised economies that it is the socio-economic development that creates the conditions to both reduce the demand and preserve water sources.

At this point it becomes fundamental to settle an underlying question: that is to say, what are the factors that determine the ability of a given society to deal with scarcity? In a situation of water shortage, which calls for a change in water use and allocation of resources among the productive sectors, "narrow coalition" i.e. stakeholder groups and society as a whole emerge. This narrow coalition pushes for a redistribution of societal assets, rather than increasing the sum of assets. Of course, the presence of pressure groups prevents the emergence of a cooperative approach and tends to emerge more clearly in unstable societies, marked by economic backwardness and strong human pressure on water resources (Homer-Dixon, 1995).

Recently, Ohlsson pointed out that the adaptation to a situation of water scarcity entails a mobilisation of social resources. This can be defined as a mix of: institutional capacity to introducing a new set of rules regarding water use and social ability to accept these technocratic solutions. The supply side strategy prevails when the technological solutions are allowed to satisfy the water demand avoiding any kind of arbitration and reducing the political cost of adjustment. The collapse of this equilibrium occurs when an ecological crisis makes the supply side solution unable to meet the demand. On this occasion, a new environmental consciousness emerges, the water crisis opens a "window of opportunity" towards demand side solutions. If the social entity develop a strong "adaptive capacity" it is also able to manage the transition to a water demand management system, gradually adopting allocative efficiency measures.

In the light of what has been said, Ohlsson identifies a "first order scarcity" which refers to the lack of water resources and a "second order scarcity" which is the lack of social resources and is related to the weakness of the institutions (Ohlsson, 1998). The presence of social resources implies a dialogue between the institutions that introduces the reforms and the citizens who become conscious of the progressive depletion of water sources and adopt a new attitude toward water as a public good.

"To the degree that distribution equity, political participation and access to education and health services are perceived to be acceptable, a social system will enjoy the commitment, loyalty and affiliation of its participants, and be prepared to respond better to changing endogenous and exogenous circumstances. At the other extreme, a system which is inequitable and coercive tends to be more rigid, prone to conflict and less able to adapt gently to internal and external disturbances (*Raskin, 1997*).

1.1. The social cycle of management and use of water resources

The theories mentioned before, particularly the one formulated by Allan and Karshenas which establishes a link between "environmental capital" consumption and economic development, and that by Ohlsson, which analyses the capability of coping with scarcity, can be used to identify a virtual social cycle of management and use of water resources (Turton, 1999). Such a cycle describes an ideal evolution, which starts from a strong pressure on water resources, that is typical of the first stages of development and reaches a gradual understanding of the water problem, which involves policy makers, technocrats and public opinion.

The mobilisation of social resources in terms of technological progress, institutional capacity building and commitment of the social system, promotes a gradual transition from productive to allocative efficiency and paves the way to a policy of protection of environmental resources.

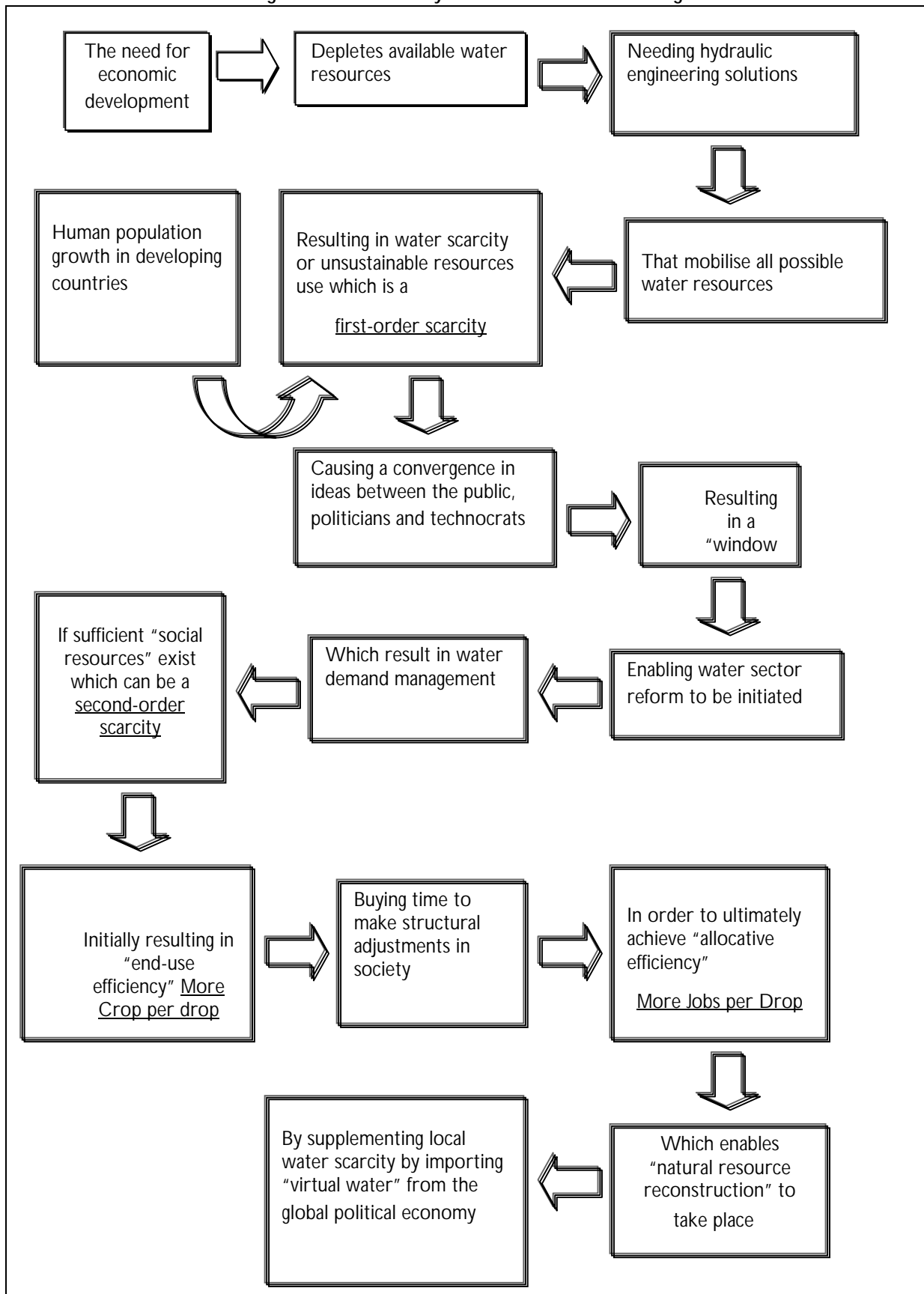
However, such a scheme does not help to interpret the processes under way in many South Mediterranean countries due to some characteristics that prevent the starting of the "virtuous cycle" described by the social cycle of management and usage of water resources. The first factor

to be considered is a perception of water as a gift of God, which is an intimate part of the material and religious Muslim culture (Allan, 2002). The existing system of value influences the society, giving rise to the perception of an infinite availability of water resource, from which derives the expectation of a low price for it. The role which water plays from a symbolic point of view, encouraged Arab governments to undertake projects in which resource management is associated with prosperity and welfare to the nation. This propaganda nourished the myth of an availability of water able to satisfy national water needs, hiding the problem of a progressive impoverishment of current resources.

Achieving allocative efficiency is difficult and should involve more than purely economic consideration. If the highest valued users are allowed to purchase all the water in a purely free market, some groups, typically farmers and farm workers, are going to lose water and their economic support base. This requires that the economy and the political system be able to provide alternative livelihoods, compensate third parties affected by market transactions and judge between diverse claims for allocation (Lundquist, Gleick, 1997).

The consensus building with respect to water policies is a complex process in which cultural, religious and social factors interact. Politicians are not free with respect to such a strategic issue of undertaking reforms, which do not receive the people's support and entail enormous costs in terms of political stability and social conflict. The idea of a "political price" associated with a change of water policies first appeared in the World Development Report of 1997 where the World Bank recognised the prominence of political factors in applying the economic principles associated with water management.

Figure 2. The Socio-Cycle of Water Use and Management



Source: Turton, A.R., Ohlsson, L., (1999), *Water Scarcity and Social Stability: Towards a Deeper Understanding of the Key Concepts Needed to Manage Water Scarcity in Developing Countries*, School of Oriental and African Studies (SOAS), London.

The process of adoption of new values concerning water use is long and politically stressful. In the developed economies a new water approach based on environmental concern and economic efficiency takes thirty years to enter in the political agenda (Reisner, 1984). The transition will be longer in the economic, cultural and political circumstances of the Mediterranean countries where economic and socio-political adaptation will be more challenging (Allan, 2001).

1.2. How to measure social adaptive capacity: the Social Water Stress Index (SWSI)

As examined above, since the capability of a society to respond to difficult challenges of water scarcity depends on factors such as general socio-economic development, education, human rights, institutional capacity, etc., There exists a very appropriate and widely accepted indicator, namely the UNDP Human Development Index (HDI) that would offer a workable proxy for the social adaptive capacity of a society.

The HDI measures the average achievements in a country in three basic dimensions of human development – longevity, knowledge, and a decent standard of living. It contains three variables: life expectancy, educational attainment, and real GDP per capita. The HDI would seem to serve as the best available intermediate proxy, not only for institutional capacity, but also generally for the level of social resources in a country. Life expectancy would serve as a proxy for the general level of welfare and development; the educational attainment as a proxy for institutional capacity; and the real GDP per capita as a measure of economic performance.

If you divide standard hydrological indicators (traditional water stress/scarcity index) by the HDI, you will get a *Social Water Scarcity Index (SWSI)* (Ohlsson, 1998), which would serve to highlight the importance of a society's social adaptive capacity to face the challenges of water scarcity. Making the calculation for a number of North Africa and Middle East Countries produces the results shown in Table 3.

Table 2. Social Water Stress Index

Countries	Water Stress Index* (WSI)	Standard hydrological categorization of water stress or water scarcity	Human Development Index (HDI)	Social Water Stress Index** (SWSI)	Social resource scarcity categorization of water stress or water scarcity
Algeria	19	Water-stress	0.737	26	Water-scarcity
Egypt	11	Water-scarce	0.614	17	Water stressed
Israel	26	Absolute water scarcity	0.913	28	Water scarce
Jordan	31	Absolute water scarcity	0.730	43	Absolute water scarcity
Morocco	9	Water stress	0.566	16	Water stress
Syria	3	Relative sufficiency	0.755	4	Relative sufficiency
Tunisia	23	Absolute water scarcity	0.748	31	Absolute water scarcity
Turkey	3	Relative sufficiency	0.772	4	Relative sufficiency
Palestinian Territ.***	16	Water-scarce	0.733	22	Water-scarce

Source: Ohlsson, L., *Water and Social Resource Scarcity*, FAO-AGLW, 1998.

***Our calculation based on Palestinian Central Bureau of Statistics data 2001.

* The Water Stress/Scarcity Index (WSI) used here equals hundreds of persons per flow unit (one flow unit is one million cubic meter of renewable water):

- Relative sufficiency: 0-5
- Water stress: 6-10
- Water scarcity: 11-20
- Absolute water scarcity: >20

** The Social Water Stress/Scarcity Index suggested here is arrived at by dividing WSI by HDI:

- Relative sufficiency: 0-9
- Water stress: 10-19
- Water scarcity: 20-29
- Absolute water scarcity: ≥30

It is very interesting to draw attention to how countries are classified according to certain set standards and how they shift along the scale when we apply, for each country, a social resource capability index according to HDI measurements. Comparisons could be made of countries with roughly the same level of water scarcity according to standard hydrological indicators, and see how the SWSI differs due to differing social resource capabilities, as measured by the HDI. According to the SWSI Israel is “merely” water scarce, due to its high level of social adaptive capacity. Algeria dramatically moved from water stress to water scarcity, while Egypt moved from “water scarcity” to “water stress”.

Box 8. Social adaptive capacity: the case of Israel

The SWSI seems to be able to shed some light on the anomaly of Israel being able to maintain high level of economic development, in spite of the fact that is classified as “beyond the barrier” according to the water scarcity index.

Between the 1950s and 1970s Israel attested high levels of water scarcity within its own boundaries. In order to maintain self-sufficiency, Israel followed a supply-side management ethos during this period, developing large and expensive water transfer schemes. In 1985 Israel's agricultural sector was consuming 80% of the water supplies yet only contributing 5% to the annual GDP, by 1995 it was consuming 58% and still only contributing 5% to the annual GDP (FAO, 1997). Industry, on the other hand, was consuming, on average 20% of water supply, while contributing 50% to the annual GDP (EIU, 1997). During the droughts of 1986 and 1991 Israel was forced to take notice of its inefficient and unsustainable policies. The droughts created a situation of emergency, which in turn allowed for the subject of “water scarcity and misallocation” to come into the political agenda and facilitated the imposition of the “reserve sector role” on agriculture. Overall, this allowed for a 30% reduction in water allocation to agriculture between 1984 and 1991. This set in motion a chain of events which reallocated water from agricultural use to municipal and domestic use and allowed Israel to pass from a model of unsustainable development to one of resource reconstruction. As Turton points out (1999), natural resource reconstruction is possible when a social entity can effectively apply a strategy of water demand management, which is possible only if the country presents a certain level of adaptive capacity to a water scarcity situation.

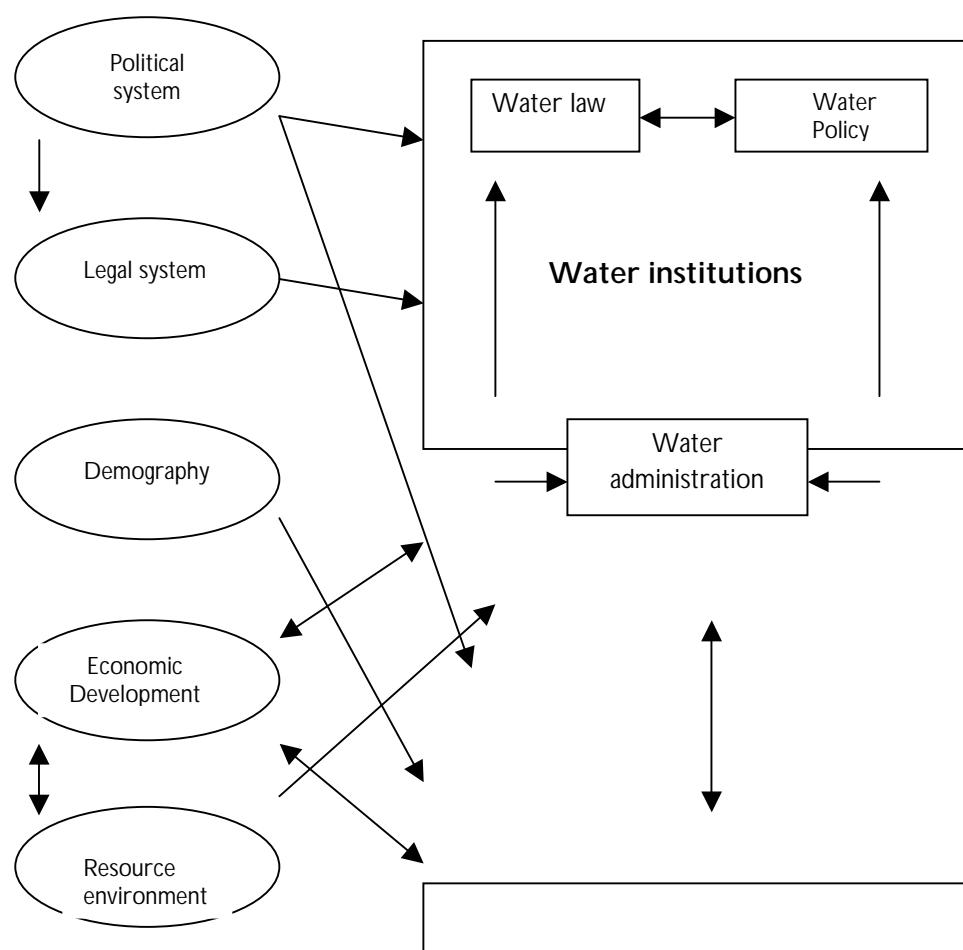
2. INSTITUTIONAL ADAPTIVE CAPACITY AND WATER SECTOR PERFORMANCE LINKAGES

It is now possible to unravel the connections between “institutional adaptive capacity” (IAC) and water sector performance. A formal institution with a high level of IAC is likely to be able to develop a more sophisticated water conservation or water demand management strategy because of the greater capacity to process data, which in turn means that a higher degree of institutionalised learning takes place. Similarly, adaptive institutions are more likely to have an institutionalised form of conflict resolution capability. This, in turn results in more economic growth potential and a higher capacity for social development.

A water institution has a strong and direct impact on water sector performance. The strength of a water institution depends, of course, on the efficacy of its individual components as well as on the degree of integration among those institutional components themselves.

Although institutional differences provide the major explanation for variations in water sector performance, the general context in which institution-performance links are evaluated is still important for providing residual explanations. Given the influence of factors exogenous to the water sector, such as political condition, economic development, demographic growth, and resource scarcity, an institutional arrangement with stronger incentive features and integration properties is likely to yield a better water sector performance when compared to others.

Figure 3. Water Sector: Institution-Performance Linkages



Source : World Bank (2001)

The World Bank has recently highlighted several aspects related to performance having both physical, financial, economic, and equity dimensions. The physical performance of water sector is evaluated in terms of the following aspects:

1. supply-demand gap;
2. physical health of water infrastructure;
3. conflict resolution efficiency (low cost and less time);
4. smoothness of water transfers across sectors/regions/users.

The financial performance of water sector is evaluated in terms of the following aspects:

1. investment gap (actual vs. required);
2. financial gap (expenditure vs. cost recovery).

The economic efficiency of the water sector is evaluated in terms of the following aspects:

1. pricing gap (water prices vs. supply costs);
2. incentive gap (water prices vs. scarcity value of water).

Finally, the equity performance of water sector is evaluated in terms of the following aspect:

1. equity between regions;
2. equity between sectors;
3. equity between groups.

Many water utilities in developing countries are failing to achieve acceptable levels of performance. Utility benchmarking can be done across a range of basic indicators of service, efficiency, and financial sustainability – including their unaccounted for water, how long they take to collect revenues, how many staff per 1000 connections, how much a connection costs, and cost recovery ratios. Such indicators can generate performance or “best practice” targets grounded in reality.

Inappropriate institutional arrangements are at the hearth of MENA's water resources management problem. There are many components that determine negatively a water sector performance. First of all, limited and vulnerable water resources constrain economic development. Present use already exceeds renewable supply, the difference being made up by the unsustainable practice of overdrawing highlands aquifers. As a result, groundwater levels are declining and water quality is deteriorating.

Performance among water and sanitation utilities in MENA differs widely, for most countries it remains well below good practice standards. In many cities in MENA drinking water supply is intermittent, with supplies sometimes being available only on one or two days per week. Intermittent supply contributes to higher incidences of pipe breaks, higher leakages level, drinking water contamination from seepage into pipes, and to lower levels of per capita use, unless households invest in storage tanks and pumps at sometimes substantial costs.

The table below summarizes data for six utilities, three of which are public (Tunis, Sana'a and Algiers), one of which has been under a private concession since 1997 (Casablanca), and two under public ownership, but operated by a private company under 4-year management contracts (Gaza since 1996 and Amman since 1999). In Amman, Unaccounted for Water was reduced from 52% to 46% during the first seven months of the Management Contract. The management contracts in Amman and Gaza are supported by the World Bank, and a private sector contract is planned for Sana'a. Other private sector contracts throughout the region may follow. Extensions in water and sewerage coverage are often supported by donor-financed investments that are arranged in parallel with private sector involvement.

The privatisation of water management improves the general efficiency but needs a special regulatory framework for dealing with the very substantial market power that would be gain by the private companies. A new regulatory framework and market rules are necessary to promote competition, to protect the interests of water supplying firms and of consumers and to take into account externalities, such as environmental concerns. MENA countries are unable to perform this tasks in a context of a decreasing role of the State in the public utilities and weak economic performances. The risk is to leave the water sector to the market forces without any governance of the long and difficult process towards an integrated water resources management, losing the challenge to respect economic efficiency, environmental sustainability and social equity.

Table 3. Water sector performance in some Mediterranean countries

	Gaza	Amman	Tunis	Sana'a	Algiers	Casablanca	Good Practice
Unaccounted for water	31%	46%	21%	50%	51%	34%	15-25%
Water Coverage	99%	100%	100%	65%	100%	100%	100%
Continuous supply	no	no	yes	no	no	yes	yes
Per-capita water use	70	80	80	50	70	110	120-150
Sewerage collection	25%	78%	77%	22%	70%	70%	-
Employees/000connections	7	5.5	10	10	8.6	6	4-6
Operation & Maintenance Cost recovery	no	no	yes	yes	no	no	yes

Source: Reiffers, J., *Méditerranée: vingt ans pour réussir*, Paris, Economica, 2000.

Box 9. Social resources scarcity and water sector performance in Jordan

During the 60s, Jordan developed its greatest water infrastructures. The establishment of dams and storage basins aimed at satisfying the increase in water demand. The supply side policy also engenders a conflict between water resources development and environmental protection. By the end of the 70s, the Jordan Water Policy encountered an environmental and political limit. The first one was linked to the scarcity of new sources to be enhanced. The second one was due to a failure of a water co-operation policy with the other co-riparians of the Jordan Basin, which had avoided the implementation of joint water projects.

The scarcity of water resources compared with a growing demand becomes more and more evident. This leads to the import of "virtual water", i.e. it forces Jordan to buy from the global markets the products that the country is not able to produce on the basis of its water endowments⁷. Import of strategic products, such as cereals, reduces the unbalancing impact linked to the situation of water stress, which is rising in the country.

...The region's governments have been able to take a less than urgent approach to managing their water according to sound economic and environmental principles because there has been a ready supply of extremely cheap water available in a very effective and operational system, the world trade in food staples (Allan, 1996:114).

In this phase Jordan enhances the measures of productive efficiency, thanks to the application of water saving technology in the agriculture sector. Modernisation of water systems, mainly carried out in the Jordan Valley, has led to a remarkable reduction of the water used for cultivation. Meanwhile, the serious droughts of 1986 and 1991, increased the water crisis, determined a gradual awareness of the environmental problems either in the political world or in the public opinion.

The need to go from a supply oriented policy to a demand oriented policy is emerging. Measures are adopted to extend the number of wastewater treatment and recycling plants, the desalination plants of brackish waters and to increase the water tariffs both in the urban and agricultural fields. As far as the efficient use of water resources is concerned, some restrictions persist. The absence of a town planning makes it difficult to connect to the sewerage system the new neighbourhoods, hence provoking infiltration in the aquifers with the occurrence of several serious pollution phenomena. The more difficult aspect related to the water resources management depends also on the non-accounted water that in Jordan range from 53.8% to 56.6% of the water supplied by the State, in relation to the international standards, of 15%.

Irrigation accounts for more than 70% of all water use. Conveyance and distribution efficiency is in the range 60-90 per cent. These efficiency are relatively high by international standards and have been improving with progressive conversion to pressure pipes. On-farm efficiency of water use varies from less than 60% (surface irrigation) to over 80% (drip irrigation). Although there has been heavy investment in water-efficient technology, high-tech systems themselves are managed very inefficiently. In the case of irrigation supplies in the Jordan Valley, overall efficiency is improving as farmers adopt modern drip irrigation technology and as a result of conversion of open channel to pressure pipe distribution systems.

Cost recovery is low as a direct result of service inefficiency and inadequate tariffs. There is neither return on capital, nor any self-financing capacity. After a recent tariff increase, the Jordan Valley Authority has improved its cost recovery ratio still recovers less than its annual O&M budget.

What clearly emerges in this context is the lack of adaptive capacity to the situation of water crisis related to the social resources scarcity. The institutions in Jordan are not strong enough to enforce the awareness of environmental problems spreading a new knowledge about water resources. The symbolic value of water prevails on the economic one and the Government is responsible for this attitude because:

“economic principles and market processes themselves are unlikely to deliver sustainable water management, without regulation and direct action by Government and its agents. Water policy can benefit from the discipline of economics, but it is no substitute for capability in political systems” (Morris, 1997).

The lack of law enforcement against illegal use and the tolerance towards water thefts confirms how water shortage is socially invisible in Jordan as in many Mediterranean countries. Indeed, the water problem in Jordan is a by-product of an institutional and political crisis whose features are the difficult introduction of politically costly “demand side management options”, combined with a strong resistance of the society to accept the technocratic solutions as being both reasonable and legitimate.

CONCLUSIONS

According to Fernarnd Braudel (1986), in the Mediterranean Region a low rate of rainfall is the cause of poor water supply and this naturally hinders agricultural development as well as an efficient productive system and a satisfactory level of livelihood.

The history of the Mediterranean Region is all about efforts and strategies adopted on the part of Man in order to adapt his survival to such limits. An efficient water supply in any area is the outcome of environmental interaction and decisive tactics of social and economic strategies. These strategies should aim at overcoming or at least curbing the limits of a water poor environment, naturally in unison with the technological level reached in this area and the existing socio-institutional structures.

The extreme diversity of the ecological and socio-economic situations of the Mediterranean Region outlines a situation where the numerous differences make it impossible to draw up homogeneously such a split-up reality. The general solution for overcoming the limits of such an area, poor in water resources is not for man to adapt to the varying circumstances as they present themselves, but to construct hydrodynamic works efficient and capable of exploiting intensively the available water resources.

The transition from an emphasis on supply management to a balanced strategy for managing both water supply and demand must be complemented by institutional reform. Optimising institutional integration depends on distributing functions to the most appropriate level. Centralisation has the advantage of co-ordination and the ability to provide integrated development with internal human and natural resources. The main disadvantages of centralisation are bureaucratic cumbersomeness and slow responses. Conversely, decentralised institutions can provide more flexibility and are usually more specialised. Their disadvantages can include poor co-ordination and redundancy among several different institutions working in a single area, and there is the tendency to delegate functions to institutions before they have the mandate.

In this regard, some functions such as development of national policy and regulatory frameworks have to be carried out at the national or state level. Other functions such as watershed managing and planning could be more effectively conducted through decentralisation by regional and local organisation.

Decentralisation, especially in retail distribution of water, makes it easier to ensure financial autonomy and to involve the private sector and water users in water management. Smaller locally managed institutions, whether public or private, have more effective authority to charge and collect fees and more freedom to manage without political interference.

In spite of the importance of decentralisation, it must be clear that decentralised water management is not possible without institutional reforms that are sensitive to traditional practices and local realities and are responsive to the new structures. In addition, efficient and effective decentralised water management requires strong government commitment and policy support, establishment of strong legal and institutional frameworks and adjustment to new roles by both water users and the governmental authorities.

The organisational structure of water supply and main water policy decisions is centralised in most Mediterranean countries. Virtually all management and planning functions are controlled by the central Government where the agriculture sector often plays the most important role in water scarce countries. Yet in some cases decision making and responsibilities are fragmented and overlap among different parties and levels of government.

Apparent duplication of efforts and lack of co-ordination among concerned government entities occurs in some countries of the region. Water resources assessment, policy, and planning functions

are not clearly separated from water and wastewater services. In practice, regulators often also represent many water users, thus creating conflicts of interest.

The performance of the water sector, like that of any other, depends heavily on the strength of its institutions. There is a need to follow the follow trend of institutional restructuring with measures such as improved co-ordination at Basin and National level, delegation of management of services, greater direct participation of users in management decisions, introduction of private sector involvement supported by adequate legislation, efficient law enforcement and strong human resource development.

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