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MENA REGIONAL WATER GOVERNANCE BENCHMARKING PROJECT

COUNTRY PROFILE – JORDAN

October 2010

This report was produced for review by the United States Agency for International Development (USAID). It was prepared by International Resources Group (IRG) in association with International Water Management Institute, Institute of Water and Watersheds at Oregon State University, Computer Assisted Development Incorporated, Nile Consultants, and ECO Consult.

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ACRONYMS

BOT	Built-Operate Transfer
EBA	Expert-based Assessment
GDP	Gross Domestic Product
IWRM	Integrated Water Resources Management
JCC	Jordan Chamber of Commerce
JCI	Jordan Chamber of Industry
JVA	Jordan Valley Authority
LEMA	Lyonnaise des Eaux - Montgomery Watson - Arabtech Jardaneh
MENA	Middle East North Africa
MoA	Ministry of Agriculture
MWI	Ministry of Water and Irrigation
NGO	Non-Governmental Organization
O&F	Organizations and Functions
OSU	Oregon State University
P&L	Policy and Legal
ReWaB	MENA Regional Water Governance Benchmarking Project
USAID	United States Agency for International Development
WAJ	Water Authority of Jordan
WUA	Water Users Association

FOREWORD

The MENA Regional Water Governance Benchmarking Project (ReWaB) project aimed to characterize water governance regimes in five Middle Eastern countries to allow comparisons both across countries and over time. In doing this, information on a variety of aspects of water governance was generated, including the country context, policies and laws, organizations, and expert-based ratings of performance. This information has been consolidated into a profile for each country in a common format.

The Jordan profile was drafted by Lucia De Stefano, Bridget Brown, Mark Svendsen, Jonathan Lautze, and Luke Sanford, with contributions from Paris Edwards, Tamer Assa'd, Ra'ed Daoud, and Kristin Chatfield. It also drew from a great many other inputs – other project team members, national collaborators, and workshop and rating session participants.

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Team Leader
Regional Water Governance Benchmarking Project

SUMMARY

COUNTRY PROFILE – JORDAN

HIGHLIGHTS

OVERALL FINDINGS OF INTEREST

High Capacity

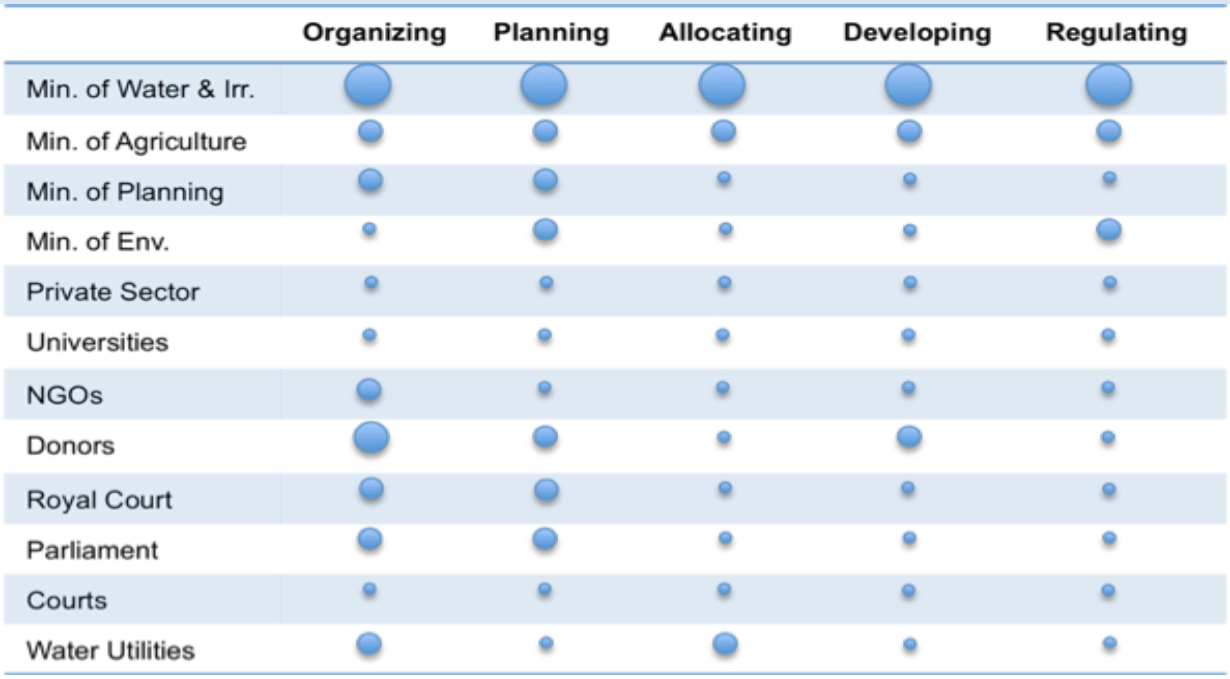
- Organizing the water sector; assigning responsibilities within newly reorganized sector
- Centralized sectoral leadership
- Formal separation of service delivery and regulatory functions
- Securing funding for the sector
- Operating and maintaining water infrastructure
- Enforcing water withdrawal limits and regulating water quality
- Collecting, storing and utilizing water data
- Policy and legal mandate for transparency in decision making processes

Potential Challenges

- Establishing water and water rights transfer mechanisms and managing potential impacts
- Employing incentives and sanctions, including water pricing, for water demand management
- Achieving effective decision-making participation and transparency in practice
- Effective coordination among national water agencies
- Developing and retaining trained professionals
- Protecting aquatic ecosystems

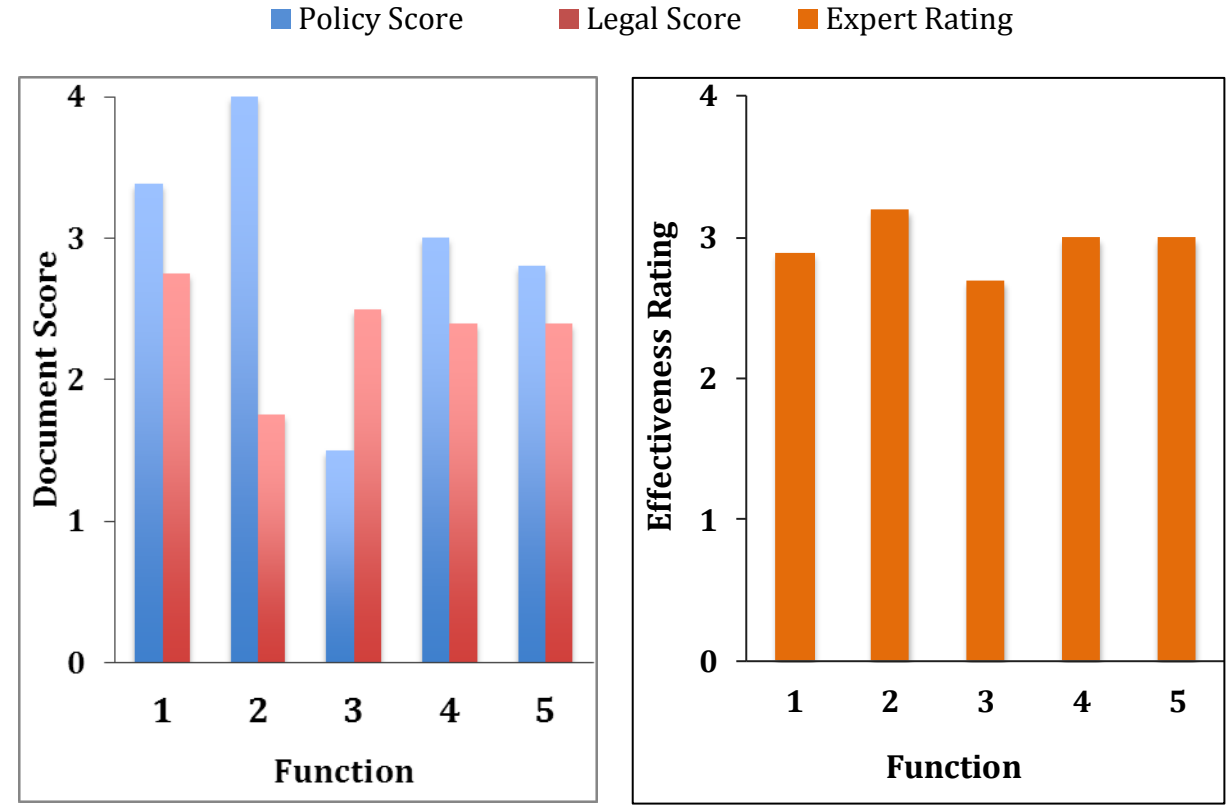
WATER SECTOR ORGANIZATIONS

RELATIVE INFLUENCE ON WATER GOVERNANCE FUNCTIONS



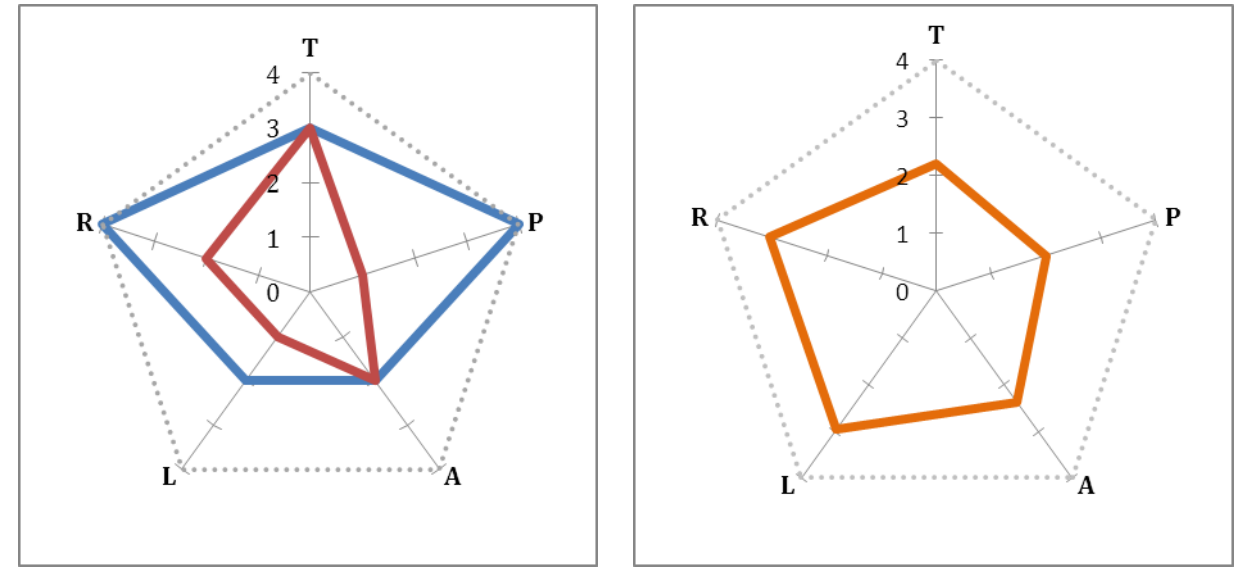
STANDARD WATER GOVERNANCE FUNCTIONS

(1) Organizing & Building Capacity – (2) Planning Strategically – (3) Allocating
(4) Developing & Managing – (5) Regulating



GOOD GOVERNANCE PROCESS FEATURES

(T) Transparency – (P) Participation – (A) Accountability – (L) Rule of Law – (R) Responsiveness



1. INTRODUCTION

Most countries of the Middle East are chronically water stressed. Population growth and climate change impacts will exacerbate that stress. Most of the region's countries have already constructed significant water resource infrastructure, but the effectiveness of water governance and management has often lagged behind. Clearly, hardware solutions to these formidable challenges are not, by themselves, sufficient. Water governance shortcomings also hamper the achievement of durable solutions to water stress.

In order to tackle water governance weaknesses it is necessary to assess the present situation and its evolution over time. The Regional Water Governance Benchmarking Project (ReWaB)[1] aims at establishing a system of water governance capacity and performance benchmarking for Middle East and North Africa (MENA) countries. After analyzing the state of the art on the subject, the project team defined concepts of *governance*, *policy*, *management*, and others and designed a strategy for assessing *de facto* water governance based on essential water governance functions and characteristics of good governance decision-making. It also suggested a three-tiered framework defining the structural capacity for effective water governance comprising policies, laws, and organizations. Based on these concepts, it defined an approach to measuring and assessing water governance and tested it in six countries in the MENA region (Jordan, Jordan, Morocco, Oman, Turkey, and Yemen).

This report summarizes the results of the ReWaB assessment for Jordan. After this Introduction, Section 2 briefly presents the project's approach to water governance benchmarking. Section 3 provides a brief overview of the political, economic, and social situation in Jordan; looks at water availability; broadly outlines the main users and managers of Jordan's limited water resources; and identifies relevant transboundary issues. Section 4 describes the main actors in Jordan's water governance and their influence on functional performance, as shown by the Organizational and Functions (O&F) Matrix. Section 5 presents and discusses the main findings of the Policy and Legal (P&L) Analysis. Section 6 presents and discusses the results obtained in the expert-based assessment (EBA), which gauged the functional effectiveness of the Jordanian water sector and the application of good governance processes in water-related decision making. Section 7 concludes the profile, highlighting areas of high capacity and areas where potential areas of improvement exist.

[1] www.rewab.net

2. THE REWAB APPROACH

2.1 CONCEPTS[2]

After critically reviewing the variety of existing definitions of water governance, ReWaB defined water governance as *the manner in which authority is acquired and exercised on behalf of the public in developing, utilizing, and protecting a nation's water resources*.

For analytical purposes, governance structures can be divided into three groups: policies, laws, and organizations (Saleth and Dinar, 2004). In this context, **policies** are purposive courses of action giving overall direction to governance, while **laws** are codified and informal "rules of the game." Finally, **organizations** are groups of individuals engaged in purposive activity.

The observation that while there are large differences in organizational structures across different countries, there is substantial consistency in the core functions that water sectors perform, led to the identification of a set of core functions, called standard water governance functions (functions), that must be performed by any effective national water sector (Table 1).

Table 1. Standard water governance functions (and sub-functions)

1. Organizing and building capacity in the water sector
1.1 Creating and modifying an organizational structure
1.2 Assigning roles and responsibilities
1.3 Setting national water policy
1.4 Coordinating and integrating among sub-sectors, levels, and national sub-regions
1.5 Establishing linkages with neighboring riparian countries
1.6 Building public and political awareness of water sector issues
1.7 Securing and allocating funding for the sector
1.8 Developing and utilizing well-trained water sector professionals
2. Planning strategically
2.1 Collecting, managing, storing and utilizing water-relevant data
2.2 Projecting future supply and demand for water
2.3 Designing strategies for matching expected long-term water supply and demand and dealing with shortfalls (including drought mitigation strategies)
2.4 Developing planning and management tools to support decision-making
3. Allocating water
3.1 Awarding and recording water rights and corollary responsibilities
3.2 Establishing water and water rights transfer mechanisms
3.3 Adjudicating disputes
3.4 Assessing and managing third party impacts of water and water rights transactions
4. Developing and managing water resources
4.1 Constructing public infrastructure and authorizing private infrastructure development
4.2 Forecasting seasonal supply and demand and matching the two
4.3 Operating and maintaining public infrastructure according to established plans and strategic priorities
4.4 Applying incentives and sanctions to achieve long and short term supply/demand matching (including water pricing)
4.5 Forecasting and managing floods and flood impacts

[2] More details on the project approach and framework can be found in the document "MENA Regional Water Governance Benchmarking Project Concept and Approach Framework" (Part I) (2009), available at www.rewab.net.

5.	**Regulating water resources and services**
5.1	Issuing and monitoring operating concessions to water service providers
5.2	Enforcing withdrawal limits associated with water rights
5.3	Regulating water quality in waterways, water bodies, and aquifers (including enforcement)
5.4	Protecting aquatic ecosystems
5.5	Monitoring and enforcing water service standards

Water governance is, in essence, a series of interlinked decisions. The way in which decisions are made can be an important determinant of the quality and content of the decisions actually reached. After reviewing the literature on the subject and critically discussing the decision-making features characteristic of "good governance," ReWaB posited a set of five decision process dimensions for use in assessing water governance (Table 2).

Table 2. Decision-making process features characteristic of good water governance

1. Transparency. Information should flow freely within a society. The various processes and decisions should be open to scrutiny by the public.
2. Participation. All citizens, both men and women, should have a voice, directly or through intermediate organizations representing their interests, throughout water governance policy formulation and decision-making.
3. Accountability and Integrity. Governments, the private sector, and civil society organizations should be accountable to the public or the interests they represent.
4. Rule of law. Legal frameworks should be fair and enforced impartially.
5. Responsiveness. Institutions and processes should serve all stakeholders and respond properly to changes in demand and preferences, or other new circumstances.

In the resulting framework policies, laws, and organizations provide the institutional structure in which water governance takes place. Effectiveness in water governance stems from effective performance of a set of standard functions. Finally, the characteristics of governance decision making provide a way of assessing the degree to which governance reflects the will of the public, its fairness, and its self-awareness and ability to adjust to changing conditions.

2.2 ANALYTIC TOOLS

In the ReWaB approach, water governance capacity is evaluated by a combination of policy, legal, and organizational analyses. The way in which capacity is employed to reach decisions, and the processes and values used in making those decisions, are assessed by expert-based in-country assessments.

ORGANIZATIONAL ANALYSIS

During preliminary interactions with local informants, significant water governance-related organizations in each country, both public and private, were identified and their roles, based on their official mandates, were outlined. These organizations were then examined, relative to the standard water sector functions, to map the *de facto* organizational coverage of the functions.

This analysis employs a matrix-based assessment tool in which panels of water-experts in the country rate the degree of *de facto* involvement of particular organizations in carrying out the water functions in that country.[3] Participants assign scores assessing the degree to which particular organizations influence decisions relating to each of the five standard water governance functions. During the process, participants discuss in groups, and then evaluate individually, the roles of the various organizations. The

[3] See *Fieldwork Protocol* at www.rewab.net for detailed description of methodology employed.

resulting O&F Matrix is presented and discussed in Section 4.2 of this document and in the Summary at the beginning of the profile.

POLICY AND LEGAL ANALYSIS

The policy and legal analysis provides document-based information on the policy and legal context for water governance decision-making in the target country. This analytic component is a desk study consisting of a systematic analysis of a set of water-related policy and legal documents retrieved early in the assessment process.[4] The documents considered include national policy papers and laws that either are specifically aimed at water, or are focused on other issues but have a direct impact on water management and governance, such as environmental or human health regulations.

The document analysis considers the water governance functions that deliver available water to the water-depending uses, including environmental uses, and the formally mandated characteristics of the decision-making processes used in making water governance decisions. The policy and legal assessment includes independent analysis based on three groups of criteria: (1) functions, (2) process features, and (3) cross-cutting categories (water types and water uses). Each of the three sets of criteria is applied to policy and legal material separately. The analysis produces a qualitative assessment of the policy and legal documentation and two sets of scores that characterize each set of materials using numerical values.

To produce the numerical scorings, a team of three analysts evaluates "tags" for each framework element to assess its extent of coverage, and assigned two scores – one for policy and one for law – between 1 (framework element is not covered in the provided documentation) and 4 (extensive documental coverage). The three analysts assign their scores independently and then reach consensus on the assigned scores through one or more iterative deliberation meetings. The results of the policy and legal analysis are summarized in Section 5 and in the Summary.

EXPERT-BASED WATER GOVERNANCE RATING

The expert-based assessment evaluates the overall level of effectiveness in performing the five standard water governance functions (functional effectiveness rating) and the extent of application of five characteristics of good governance decision-making (process features rating).[5] Both ratings are derived from questionnaires completed by national water experts at a Rating Session in the country. To assess functional effectiveness, participants in the Rating Session are asked to complete the questionnaire using a 4-value rating scale. Respondents discuss the scoring in groups and then complete the questionnaire individually.

A second questionnaire is used to rate the degree of application of the five good governance decision-making features defined in the ReWaB framework. Country performance was assessed against the highest conceivable level of each of the five features while considering a common set of five water-related challenges that are used in all countries in which the assessment is conducted. These challenges are: (1) increasing demand for drinking water; (2) decreasing groundwater levels; (3) strategic planning for a national water policy; (4) regulating water quality in rivers, aquifers, and waterways; and (5) matching supply and demand in agriculture. For each challenge, participants are asked to use a 4-value scale to score two to five statements related to the five decision-making features. Participants discuss the scoring in groups and then complete the questionnaire individually.

The resulting scores of both ratings together with their analysis are presented in Section 6 and in the Summary.

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[4] See *Desk Study Protocol* at www.rewab.net for detailed description of methodology employed.

[5] See *Fieldwork Protocol* at www.rewab.net for detailed description of methodology employed.

3. WATER RESOURCES CONTEXT

This section provides a brief overview of the political, economic, and social situation in Jordan to provide a context for Jordanian water resource governance and management. In addition, it outlines water availability and the main water users in Jordan and addresses relevant transboundary issues involving Jordan and its neighboring countries.

3.1 POLITICAL STRUCTURE

Jordan is governed by a constitutional monarchy. It relies on a bicameral legislature for policy making. Water administration was partially centralized in 1957, and more completely centralized in 1988, leading much of the Middle East in this regard (Haddadin, 2006).

3.2 ECONOMY

Jordan relies largely on a service-based economy because of its lack of natural resources. It is in the midst of broad economic reforms that focus on privatization and free trade. A decrease in government subsidies is helping to reduce the budget deficit, and increasing the amount that the government can spend on human development projects like health, education, and social security (World Bank, 2008). Jordan has a Purchasing Power Parity-adjusted per capita GDP of US $5474, (World Bank, 2008) which reflects its middle-income status.

3.3 GEOGRAPHY AND POPULATION

Jordan has a population of approximately 6.2 million people, including some 2 million refugees from Palestine and Iraq (CIA World Factbook, 2009). Its population is clustered largely in three main cities, with 72% of the population living in Amman, Irbid, and Zarqa (USAID, 2009). Jordan occupies an area of 89 thousand square kilometers, which is primarily desert, though the northwest does have a rainy season from November to April. It has only 26 km of coastline on the Red Sea, and is conspicuously lacking the oil resources of many of its neighbors. Jordan's population is growing at a rate of 2.2% per year.

Social attitudes towards water are influenced by Islamic principles, which generally oppose the privatization of water. As a result, private spring-owners cannot prevent others from using the water that the spring provides, and purified wastewater has to be declared fit for drinking by religious leaders before the public would use such water (Haddadin, 2006: 211-212). The World Values Survey of 2001 showed that Jordanians are more likely to value environmental protection over economic growth. A number of non-governmental organization (NGOs) that seek to increase awareness about water issues in Jordan have been identified as having "relatively strong" influence (World Bank, 2007, 54).

3.4 WATER AVAILABILITY

Rising population coupled with limited rainfall creates conditions of water scarcity for most of the country. Indeed, beginning in the 1950s with an influx of Palestinian immigrants that severely taxed the country's water distribution system, Jordan's history has been plagued by water shortages. The government has worked to mitigate the shortages by building infrastructure. It subsidizes the supply of water for livestock farmers in rural areas (Haddadin, 2006). It also imports virtual water through grain and food. In 2002, Jordan consumed 1394 cubic meters of virtual water per person, and only 177 cubic meters of fresh water per person (Haddadin, 2006; CIA World Factbook, 2009). Jordan's groundwater situation is dire as a result of excessive pumping. Aquifer levels have been dropping between 0.2 and 1.5

m annually for the past 25 years (Wardam, 2009). Most Jordanians enjoy access to improved sanitation: 94 and 85 percent for urban and rural populations respectively, outperforming neighboring countries. Access to drinking water is also high and reasonably equitable, with approximately 95 percent of both urban and rural residents served (World Bank, 2007).

Municipal water is the highest priority for water allocation, though it only claims 30 percent of the freshwater use of the Kingdom (CIA World Factbook, 2009). Traditionally, domestic water needs were met from springs or cisterns. However as cities grew, especially Amman, water that had previously been allocated to agriculture was diverted for municipal use. Jordan has implemented numerous infrastructure projects that transfer water to meet municipal demand, but rapid urbanization makes keeping up a formidable task (Haddadin, 2006). Treated wastewater, in exchange, has been returned for agricultural use, and this resource currently comprises more than half of the country's irrigation water supply. Industry currently uses only about 4 percent of total freshwater resources, but that figure is expected to increase rapidly over the next 20 years.

While less than one percent of Jordan's land is considered permanent irrigated agriculture (CIA World Factbook, 2009), agriculture is nonetheless important to the economic and social fabric of the country. The climate in the Jordan Valley is well suited to agriculture, especially for growing winter fruits and vegetables, but Jordan's irrigated agriculture sector can no longer produce enough to sustain its growing population and is severely constrained by the paucity of water resources. This is most pronounced in years of low rainfall, as agricultural uses of water are a lower priority than municipal or industrial uses. However, farmers in the Jordan Valley are using an increasing amount of treated wastewater from Amman for irrigation, and as wastewater treatment improves, the area irrigated with treated wastewater could increase (Alfarra, A. 2009). Upland agriculture in Jordan relies primarily on groundwater for irrigation. However, groundwater is also scarce, and the Jordanian government has passed several laws and ordinances to reduce groundwater over-abstraction. Jordan takes a relatively comprehensive approach to irrigation water policy by addressing infrastructure, technology, and efficient use. In the early 1950s, Jordan developed a central conveyance and distribution system for water. The Kingdom continued to expand this systsem in the 1970s in order to restore the Jordan Valley after the destruction resulting from the 1967 war. Reliable, centralized water distribution was also politically favored because it was felt that the higher standard of living would increase the population of the Jordan Valley and deter Israel from attempting to occupy the land (Haddadin, 2006: 76-77).

3.5 TECHNOLOGY AND INFRASTRUCTURE

Technology has contributed significantly to Jordan's agricultural water use by improving efficiency. For example, the switch to pressure pipe networks and drip irrigation systems improved efficiency from 45 percent to about 75 percent (Haddadin, 2006: 80). Digital meters installed at each farm unit in the Jordan Valley are intended to measure water use, though maintenance is a problem. Jordan is encouraging the development and use of crops that are resistant to drought and high soil salinity (Water Authority of Jordan, 2008). Increased irrigation efficiency is also encouraged through the use of tariffs, the latest of which takes crop water requirements into account (FAO Aquastat, 2009). These technological improvements have assisted both groundwater irrigators and those in the Jordan Valley.

3.6 TRANSBOUNDARY ISSUES

Jordan faces a number of transboundary issues because a significant portion of its water is withdrawn from rivers that flow through several other countries. Jordan's most notable transboundary water agreements are with Israel. Article 6 of the 1994 Jordan-Israeli Peace Treaty outlines cooperation on issues including mutual assistance in alleviating water shortages, prevention of contamination of water resources, transfer of information, and joint research and development in water-related subjects. The bilateral treaty also includes a concession by Jordan to Israel to pump an additional 20 million cubic meters (mcm) of water to Israel during the winter in exchange for 20 MCM that Israel concedes to

deliver to Jordan in the summer months. A number of the stipulations in the treaty were part of the original 1955 Johnston Plan, including limited Israel's share in the Yarmouk to 25 mcm per year (Haddadin, 2006: 256-7). Jordan also works with Syria in the Jordan-Syrian Higher Committee to manage the Yarmouk River basin (FAO Aquastat 2009). Lastly, Jordan shares the Disi aquifer with Saudi Arabia where it is currently involved in a "quiet pumping race." While it is unlikely that this resource competition will lead to conflict, it is also unlikely that a formal sharing agreement will result in the foreseeable future (Ferragina, E. & Greco, F., 2008).

4. ORGANIZATIONAL ANALYSIS

This section describes the prominent organizations involved in water management in Jordan and their roles in the water sector. Then, the level of *de facto* influence of these organizations in decision-making related to the five standard water governance functions is assessed using an Organizations and Functions Matrix.

4.1 MAIN ORGANIZATIONS IN THE WATER SECTOR

Jordanian organizations can be divided into four broad groups. Government organizations are described first. The main actors in the private sector are described next, after which three of the main NGOs involved in water governance are described. Finally, a description of universities is provided.

Three primary government organizations have been created to deal with water issues. The Water Authority of Jordan (WAJ) and the Jordan Valley Authority (JVA) manage water in each of their respective areas of responsibility. The secretaries of each of these institutions report to the Ministry of Water and Irrigation (MWI), who has overall control of such key tasks as formulating water policy, strategic planning and development, water allocation options, maintaining a water resources data base, and monitoring and controlling water policy (Beaumont, 2005: 147). These three organizations play a central role in framing, implementing, and enforcing water policy, but other ministries also play a role. The Ministry of Health deals with drinking water and wastewater and the Ministry of Planning helps secure funding and works with other organizations to plan development strategies.

Ministry of Water and Irrigation. MWI was established in 1988, in response to Jordan's recognition that it needed a more integrated approach to national water resources management. Since its establishment, MWI has been responsible for developing water policy and for water master planning, as well as administrative restructuring of the water sector. MWI is the official body responsible for the overall water supply and wastewater system, planning and management, the formulation of national water strategies and policies, research and development, information systems and procurement of financial resources. The MWI in general, and the Minister in particular, is responsible for coordination among the MWI, WAJ, and JVA. Though both WAJ and JVA predate the MWI, both are affiliated with the Ministry, and their quasi-separate status represents an attempt by the government to separate functions of water service delivery from those of regulation and oversight.

Water Authority of Jordan. The WAJ was established in 1983 as an autonomous corporate body, with financial and administrative independence but linked with MWI. The government scrutinizes it through the Central Audit Bureau and the Bureau of Supervision and Inspection. WAJ is responsible for municipal water supply and wastewater services as well as for water resources planning and monitoring, construction, operations, and maintenance. The organizational structure of the Authority is highly centralized. The utilities in each governorate are responsible for operating and maintaining the water and wastewater systems, dealing with subscribers' issues, and project supervision. Most of them enjoy some autonomy, though key tasks are managed centrally, including financial and human resource affairs, capital investment, water quality monitoring, and planning.

Jordan Valley Authority. The JVA was established in 1973 as the Jordan Valley Commission, but received its current name in 1977. The area of JVA's responsibility extends from the Yarmouk River in

the North to the Red Sea in the South. The Eastern extension of the area is limited by the 300 m contour line north of the Dead Sea and the 500 m contour line south of the Dead Sea. The Jordan Valley Authority is a governmental organization responsible for the social and economic development of the Jordan River Valley, including the development, utilization, protection and conservation of water resources. The King Abdullah Canal serves as the backbone of the JVA water distribution system north of the Dead Sea and is used to irrigate farm units.

Ministry of Agriculture. The Ministry of Agriculture (MoA) is responsible for a wide variety of tasks, ranging from managing public lands to regulating hunting to protecting soil resources. The ministry's stated goals with respect to water are to maximize production of food and agricultural outputs, achieve sustainable use of natural agricultural resources without harming the environment, and improve irrigation water use efficiency at the farm level. The MoA is also invested in maximizing productivity, in which water plays a large role. The MoA researches efficient crop rotation patterns and varieties of crops which are most water-efficient, as well as other issues contributing to water productivity.

Ministry of Health. The Ministry of Health provides a similarly broad array of services. Its water responsibilities are to monitor the quality of drinking water resources and inspect any potential source of pollutants. The Ministry regulates all potable water regardless of its source. It has overall responsibility for examining and permitting any imported or produced potable water including the processes of treatment, transmission, distribution, and storage of potable water to ensure its quality.

Ministry of Environment. The Ministry of the Environment is the newest ministry in the government. Established in 2003, its mandate is to maintain and improve the quality of the Jordanian environment by sustaining and conserving Jordan's environmental resources and contributing to sustainable development. Its connection to water policy is less developed, but it has dealt with several cases of poor water quality and over-use of water negatively effecting the environment.

Royal Hashemite Court. The Royal Hashemite Court, part of the executive branch, helps create and fund water policies (Beaumont 2005, 147).

Farmers. Although agriculture withdraws about 60 percent of Jordan's water and is thereby the largest user of water in the country, it contributes directly only about 3 percent of GDP. Most farmers in Jordan own small plots, 65 percent of them having less than 3 hectares. However, these areas comprise only 12 percent of total farmland in Jordan. Thus in Jordan, as in most countries, the majority of farmland is owned by a relatively small number of farmers. Most of the farmers who own land are men; women own only about 5 percent of the total land area. However, women represent nearly half of the farm worker population. Around 50 percent of all farm workers have family ties to their landowners. In the Jordan Valley, much of the farm worker population is made up of Egyptian migrants. Farmers exercise some political influence through farmer organizations, which enjoy strong support from the government.

Water User Associations. The government hopes to gradually reduce its role in water distribution and replace the current system with Participatory Irrigation Management, where farmers take on the responsibility of managing water delivery to their farms. If the system is successful in pilot areas it will be extended to all irrigation systems (Water Authority of Jordan, 2008). Currently, some farmers in the Jordan Valley participate in the management of Jordan's irrigation systems through Water User Associations or Farmers Committees. These groups have been helpful in locating and reporting system leakages, managing irrigation lines, and representing farmers to the Jordan Valley Authority. Moreover, these groups are increasing the level of trust between farmers and the Jordan Valley Authority (Haddadin, 2006: 203-4).

Industry. Industry in Jordan is using an increasing amount of water. By projecting future growth rates, the World Bank estimated that even if all water were diverted from agriculture to industry, by the year

2020 there would still not be enough water to support continued growth (Wardam, 2009). As a result, both the farming and industrial sectors seek to influence water policy through the Chamber of Commerce and the Chamber of Industry.

Private Water Corporations. Private organizations provide water for much of the population through desalination and purification plants, and the government relies on them to treat wastewater. A French-Jordanian collaboration, Lyonnaise des Eaux-Montgomery Watson-Arabtech Jardaneh (LEMA) holds a contract to serve 37 percent of Jordan's population (Al-Jayousi, 2003). The private sector is also an important source of funding, which removes a portion of the fiscal burden from the government and transfers it to implementing consortiums. In order to attract this funding, Jordan has utilized Build-Operate-Transfer (BOT) contracts in the development of water infrastructure (Haddadin, 2006: 118). Funds for building are contributed by the government through contractors who build and operate a facility for a time and then transfer control back to the government. In Jordan, the concessions period of private operation tends to be fairly long, and the government sometimes decides to leave control in the hands of the private operator. This results in situations, like LEMA's, where a private corporation is responsible for ongoing treatment and distribution of water for the public.

The most significant of these involves the As-Samra BOT contract for wastewater treatment. This plant serves approximately 45 percent of Jordan's population. To update the facility and build a pre-treatment plant, another BOT contract was negotiated in 2003 with Jordan contributing 50 percent of the project's capital, while 20 percent came from the implementing consortium's equity, and 30 percent from a consortium of banks as a loan to the implementing consortium. In order to achieve cost recovery for this project, wastewater tariffs in Amman and Zarqa Governorates were increased by about 12 percent in 2001 (Haddadin, 2006: 201-2). Jordan hopes to use this model to develop public-private partnerships throughout the country.

Consulting Companies. A variety of different companies work with international lenders, NGOs, and the Jordanian government to help plan, design, and implement major infrastructure developments in the country. Consulting companies consist of both Jordanian companies and international companies, but international companies normally partner with Jordanian ones on projects.

Non-Governmental Organizations. NGOs fulfill differing roles in Jordan – from providing water to refugees to managing protected areas. Mercy Corps, an international NGO, began working in Jordan in 2003. Its main goal is to assist refugees by providing services, including water provision and storage. The Royal Scientific Society, another NGO, was established in 1970 to disseminate technical information to the private sector. It does this through workshops and technical consultations. Furthermore, it provides real-time water quality data from national water testing facilities. Another NGO, the Royal Society for the Conservation of Nature, enjoys considerable support from the government. It was established in 1965, and provides a variety of services, including supervising protected areas for the Ministry of the Environment and issuing hunting and fishing permits for the Ministry of Agriculture. It also collaborates with the World Bank to generate international support for environmental provisions in water legislation in Jordan.

The Jordan Chamber of Commerce, with farmer organizations as influential members, coupled with the Jordan Chamber of Industry, represent the affiliated economic sectors in advocating with the government and promoting economic growth.

Universities. At present, there are 10 governmental and 18 private universities in Jordan. Just over 2.5 percent of Jordan's total population is enrolled at university. In the years between 2000/2001 and 2006/2007, Jordan has seen an increased demand for higher education with enrollments growing at an annual rate of 14 percent from 77,841 to 218,900 students. The number of universities has increased significantly during the last 20 years. Universities are responsible for a large portion of government-

funded research on water issues. Furthermore, faculty members of universities serve on governmental committees such as the Royal Water Committee. Finally, universities train the next generation of water experts that will serve in government ministries, firms, and NGOs, and so exert significant indirect influence on those institutions.

4.2 ORGANIZATION AND FUNCTION MATRIX

This section presents the results of a Workshop held in Jordan in June 2010 attended by 21 water experts active in the Jordanian water sector representing a range of backgrounds. Participants in the workshop evaluated the roles of different organizations by assessing the degree to which an organization influences decision-making in each of the five standard functions. They first discussed in groups, and then evaluated individually, the roles of the various organizations. Their scores were then averaged to yield the value shown in Table 3. Assessed organizations comprise rows across the matrix, while the five standard water governance functions comprise cross-cutting columns.

Each cell in the interior of the table contains a score that reflects the degree to which a particular organization influences decisions about a particular function. The scale ranges from 1 to 5, where 5 indicates the highest level of influence. To give a quick visual picture of the relative magnitude of the scores, individual cells have been shaded such that darker cells indicate higher levels of influence.

Table 3: Organizations influencing decision-making in the Jordanian water sector; grey tones correspond to the following scoring intervals, from lighter to darker levels of shading: 1.0-1.9, 2.0-2.9, 3.0-3.9, 4.0-5.0.

	Organizing	Planning	Allocating	Developing	Regulating	**Average**
Ministry of Water and Irrigation	4.9	5.0	4.8	5.0	4.5	**4.8**
Ministry of Agriculture	2.5	2.8	2.5	2.3	2.5	**2.5**
Ministry of Health	1.8	2.0	1.3	1.0	2.8	**1.8**
Ministry of Planning and International Cooperation	2.5	1.5	1.0	1.2	1.3	**1.5**
Ministry of Environment	1.8	2.0	1.8	1.0	2.5	**1.8**
Private Sector	1.5	1.8	1.3	1.8	1.0	**1.5**
Universities	1.8	1.3	1.3	1.5	1.3	**1.4**
NGOs	2.0	1.5	1.5	1.8	1.5	**1.7**
Donors	3.3	2.5	1.8	2.8	1.8	**2.4**
Royal Court	2.8	2.3	1.3	1.3	1.3	**1.8**
Parliament	2.0	1.3	1.3	1.0	1.3	**1.4**
Courts	1.3	1.0	1.5	1.0	1.8	**1.3**
Water Utilities	2.0	1.0	2.0	1.3	1.3	**1.5**
Average	**2.3**	**1.9**	**1.8**	**1.8**	**1.9**	

Organizing and Building Capacity has the greatest collective organizational involvement. Many of the organizations examined scored highest or second highest in the *Organizing* function, and the aggregate level of organizational involvement was highest in this function. The relatively high level of involvement in *Organizing* may reflect the widespread interest in decision making at this level and the broad range of interests involved. Those with lower levels of involvement in *Organizing* were the Private Sector, Universities, Ministry of Environment, and Courts.

Allocating has least collective organizational participation. *Allocating* was the function with the lowest level of aggregated organizational influence. In fact, only three organizations scored at least 2 in this function. Those organizations were the MWI, which scored highly across the board, the Ministry of Agriculture, which also showed high levels of involvement in all functions, and Water Utilities, who scored the third highest overall.

Other functions have low organizational involvement. *Planning*, *Developing*, and *Regulating* also averaged less than two in collective organizational influence. Furthermore, the most involved organization in each of these areas was the Ministry of Water and Irrigation. *Developing* had only a slightly greater overall level of organizational involvement, suggesting that a few actors wield lots of influence in that function. In particular, donors had a strong influence on the developing and managing function. Involvement in *Planning* and *Regulating* was more distributed among different actors.

The MWI is the dominant and most influential water organization in Jordan. The MWI, including JVA and WAJ, received very high influence ratings from all of the participants. In fact, all but one group of participants rated the Ministry of Water near 5 in all of the functions. This indicates that the MWI does coordinate overall water policy and that the MWI is perceived as the primary water institution in the country in all areas of water governance. No other organization came close to the influence that the MWI had in any single area or overall.

The Ministry of Agriculture is fairly influential in the different functions. Of the other ministries that deal with water functions, the Ministry of Agriculture is the most involved. This is a bit surprising given agriculture's relatively small share of GDP. However the concentration of land ownership suggests that a relatively small number of agricultural land owners may have outsized influence on water policy. The Ministry of Agriculture is responsible for irrigation projects and for enhancing the productivity of farmers. The ministry provides financial incentives for farmers to produce, including substantial government subsidies. It also performs research on water efficiency, which probably explains its relatively high score in *Planning*. It was one of only two organizations that received an average score of over 2.

Donors are more involved in the water sector than any organization besides the MWI and Ministry of Agriculture. The high level of donor involvement in Jordanian affairs reflects the importance of donor financing in water development and management. Importantly, donors are most involved in *Organizing*, which includes sub-functions related to securing funds for the water sector as well as training staff and raising awareness about water issues. Donors appear influential in *Developing*, a function in which many other institutions were not as involved. This is likely a result of their financing of water infrastructure projects, with concomitant influence over project choice and design.

4.3 SUMMING UP

In sum, Jordan has potentially strong centralized leadership in the MWI and has separated service delivery from regulation, formally if not in practice. It appears that Jordan's framework of organizations has few gaps in functional coverage, with frequent involvement of multiple organizations in functions like *Organizing* but with only a few actors involved in other functions like *Allocating*. Government organizations play the leading roles in the water sector, with the MWI and its affiliates as the "star". Indeed, the MWI was highly involved in all of the functions, supported by the Ministry of Agriculture, which was medially involved in each function. These two ministries were supplemented by other organizations that demonstrated high involvement in specific functions.

5. POLICY AND LEGAL ANALYSIS

This section summarizes the analysis of water governance capacity for Jordan using available policy and legal documents. The documents originate primarily from the three major water governing bodies in Jordan – the Ministry of Water and Irrigation and its affiliates the Jordan Valley Authority and the Water Authority of Jordan. A total of 25 English-translated documents were obtained for the analysis (Annex 1)[6]. Though the documents themselves are all official, several of the translations are unofficial, where official translations were unavailable. Eleven of the documents are policy documents. All of the policy documents are specific to the water sector, ranging in date from 1997 to 2008. Fourteen legal documents were also provided, ranging in date from 1988 to 2006. Three of the statutes originate from outside the water sector, but contain clauses or articles that relate to water resources. The remaining 11 legal documents pertain specifically to either direct uses or sources of water resources.

This section present a brief analysis of the document coverage and the numerical scores assigned to such coverage.

5.1 FUNCTIONS

Table 4 summarizes the results of the policy and legal scoring, showing the averages of the scores for the individual sub-functions. The sub-function scores are broken out and presented at the beginning of each subsection below.

Table 4: Policy and legal scores by function; grey tones correspond to the following scoring intervals, from lighter to darker levels of shading: 1.0-1.9, 2.0-2.9, 3.0-4.0.

Functions	Policy Score	Legal Score
1. Organizing and building capacity in the water sector	3.4	2.8
2. Planning strategically	4	1.8
3. Allocating water	1.5	2.5
4. Developing and managing water resources	3	2.4
5. Regulating water resources and services	2.8	2.4

ORGANIZING AND BUILDING CAPACITY IN THE WATER SECTOR

Within the Jordanian documents, the two most comprehensively covered sub-functions are 1.1 and 1.2. Sub-functions 1.5 and 1.8 are covered the least. Heavy reliance on the growth of the private sector appears to be a strong focus and is therefore deserving of careful consideration as improvement efforts continue.

[6] These documents are available in a searchable database at www.rewab.net.

Table 5: Policy and legal scores for Function 1, by sub-function; grey tones correspond to the following scoring intervals, from lighter to darker levels of shading: 1.0-1.9, 2.0-2.9, 3.0-4.0

Sub-Functions	Policy Score	Legal Score
1.1.Creating and modifying an organizational structure	3	4
1.2 Assigning roles and responsibilities	4	4
1.3 Setting national water policy	4	2
1.4 Coordinating among sub-sectors, levels, and national sub-regions	3	3
1.5 Establishing linkages with neighboring riparian countries	3	2
1.6 Building public and political awareness of water sector issues	4	2
1.7 Securing and allocating funding for the sector	3	3
1.8 Developing and utilizing well-trained water sector professionals	3	2
Average Function 1	**3.4**	**2.8**

Sub-function 1.1, creating and modifying an organizational structure, is apparent through emphasis on centralization of water management under the MWI, and the two semi-autonomous corporate bodies, WAJ and JVA, with responsibilities explicitly divided among the three to reduce overlap. WAJ and JVA are officially established in Jordan's legal documents and duties are explicitly transferred and consolidated from various agencies into the jurisdiction of each. The corporate nature of these two bodies demonstrates a move toward privatization. The MWI's supervisory role is also confirmed.

Through Sub-function 1.2, roles and responsibilities are assigned to the newly appointed and reorganized organizations. Through administrative authority, these assignments specify roles and procedures to carry out the nation's water management goals. Two policy documents focus heavily on this topic, and extensive coverage is evident in the legal documentation.

Sub-function 1.3, setting national water policy, can be characterized by several major themes that are consistent among Jordan's policy documents. Sustaining existing agriculture, tourism, and industry are all important priorities for Jordan, as well as public health, pollution abatement, and waste management. While the legal documents list policies related to state ownership of water resources, the policy documents contain the bulk of the content surrounding this sub-function.

Sub-function 1.4, establishing linkages among sub-sectors, levels, and national sub-regions, is a clear and consistent goal among the Jordanian documents, commonly reported as "cooperation" and "coordination." While this goal extends to many sectors, the main focus is on MWI, JVA, and WAJ. Clauses requiring coordination are present in the legal material.

Likewise, Sub-function 1.5, establishing linkages with neighboring riparian countries, was evident. Content emphasizing regional or international coordination was found in several of the policy documents. Additionally, by law, the MWI is responsible for implementing these goals, particularly where pollution abatement is concerned.

Sub-function 1.6, building public and political awareness of water sector issues, is stated as a policy, to improve management of water resources by professionals and use practices by the general public. Through law, awareness tasks are delegated to various ministries.

Sub-function 1.7, securing and allocating funding for the sector, is found throughout the documentation. The main focus is on cost recovery and donor support for development projects. Select legal documents focus on corporate investments and delegation of fund-securing responsibility to various entities.

Sub-function 1.8, developing and utilizing well-trained water sector professionals, though clearly a goal, is not awarded detailed attention. Through policy, emphasis is on skill-building, farmer education, and improved performance and creativity. Highly trained and qualified professionals are mandated in select laws.

PLANNING STRATEGICALLY

Function 2 was present in the majority of Jordan's documents. The policy documents overall covered Function 2 comprehensively, with Sub-functions 2.1 and 2.3 having a slightly stronger presence in the language than 2.2 and 2.4. Evidence of Function 2 within the legal documents was minimal, with the exception of Sub-function 2.1. Overall, strategic planning in Jordan's water sector, as it is established through Function 2, puts a heavy focus on data collection and dissemination, as well as innovative management strategies geared toward sustainability of the resource.

Table 6. Policy and legal scores for Function 2, by sub-function; grey tones correspond to the following scoring intervals, from lighter to darker levels of shading: 1.0-1.9, 2.0-2.9, 3.0-4.0.

Sub-functions	Policy Score	Legal Score
2.1 Collecting, managing, storing, and utilizing water-relevant data	4	3
2.2 Projecting future supply and demand for water	4	1
2.3 Designing strategies for matching expected long-term water supply and demand and dealing with shortfalls	4	2
2.4 Developing planning and management tools to support decision-making	4	1
Average Function 2	4.0	1.7

Sub-function 2.1, collecting, managing, storing, and utilizing water-relevant data, is well established throughout the policy documentation. Data collection, sharing, and coordination are a key focus and a clear policy priority for the country. Provisions for monitoring and sampling are prevalent in the legal material.

Sub-function 2.2, projecting future supply and demand for water, is extensively addressed in the policy material, though lacking in the legal material. Projections on water demands per sector are presented through tables and charts. Population growth and the shift toward industry are discussed as stresses to supply.

Among the policy documents, Sub-function 2.3, designing strategies for matching expected long-term water supply and demand and dealing with shortfalls (including drought mitigation strategies), is characterized by a multitude of suggested approaches to water conservation and sustainable use. About half of the legal documents mention supply and demand strategies as well.

Sub-function 2.4, developing planning and management tools to support decision making, was not covered by any of the legal documents. Documents that address decision support systems tend to emphasize the importance of technological tools for future planning, and advocate the use of up-to-date imagery and data-processing software.

ALLOCATING WATER

The majority of content surrounding allocation is concentrated within two legal documents – Law No. 30 and Bylaw No. 85. Sub-function 3.1 is covered the most comprehensively, followed by Sub-function 3.3. The remaining two sub-functions are addressed marginally overall.

Table 7: Policy and legal scores for Function 3, by sub-function; grey tones correspond to the following scoring intervals, from lighter to darker levels of shading: 1.0-1.9, 2.0-2.9, 3.0-4.0.

Sub-functions	Policy Score	Legal Score
3.1 Awarding and recording water rights and corollary responsibilities	2	3
3.2 Establishing water and water rights transfer mechanisms	2	2
3.3 Adjudicating disputes	1	3
3.4 Assessing and managing third party impacts of water and water rights transactions	1	2
Average Function 3	**1.5**	**2.5**

More prevalent in the legal documents than the policy documents, Sub-function 3.1, awarding and recording water rights and corollary responsibilities, focuses on permits and licenses for water withdrawals. Additionally, discussions of crop water requirements and improving consistency and efficiency are included.

Sub-function 3.2, establishing water and water rights transfer mechanisms, is presented in one policy document, and minimally in legal material. Focus is on the expropriation authority of the MWI, JVA, and WAJ.

Sub-function 3.3, adjudicating disputes, is not addressed in any of the policy documents. Language in the legal documents centers around disputes between government and citizens, and facilitation of the appeals process in the event of expropriation.

Sub-function 3.4, assessing and managing third-party impacts of water and water rights transactions, is covered minimally. Third-party impacts of water extraction are considered when issuing permits for well use, and when determining well depth and measures to protect municipal drinking water resources.

DEVELOPING AND MANAGING WATER RESOURCES

Developing and managing water resources was covered in a range of policy documents. Less coverage was evident in the legal documents. Among the policy documents, there is an overarching emphasis on diverting some of the maintenance and construction work to the private sector, both as a cost-cutting measure and to stimulate private sector involvement in water development and management. Sub-function 4.1 is covered the most extensively, followed by Sub-functions 4.3 and 4.4.

Table 8: Policy and legal scores for Function 4, by sub-function; grey tones correspond to the following scoring intervals, from lighter to darker levels of shading: 1.0-1.9, 2.0-2.9, 3.0-4.0.

Sub-functions	Policy Score	Legal Score
4.1 Constructing public infrastructure and authorizing private infrastructure development	4	3
4.2 Forecasting seasonal supply and demand and matching the two	2	1
4.3 Operating and maintaining public infrastructure according to established plans and strategic priorities	4	3
4.4 Applying incentives and sanctions to achieve long and short term supply/demand matching	4	3
4.5 Forecasting and managing floods and flood impacts	1	2
Average Function 4	**3.0**	**2.4**

Sub-function 4.1, constructing public infrastructure and authorizing private infrastructure development, covers all management plans to expand and improve infrastructure as well as all private development. Language is prevalent in the policy material. Legal documents focus on protecting supplies through licensing.

Sub-function 4.2, forecasting seasonal supply and demand and matching the two, is minimally established. Policy documents focus on efficiency in water application and cost-effective supply efforts. Legal documents establish maximum water-delivery quantities.

Sub-function 4.3, operating and maintaining public infrastructure according to established plans and strategic priorities, is found in the policy documents as efforts to reduce inefficiencies and improve facilities. Maintenance of infrastructure is mandated in legal documents.

Sub-function 4.4, applying incentives and sanctions to achieve long and short term supply/demand matching (including water pricing), is addressed through fees for misuse, and pricing that reflects water's value in the policy material. Pricing and prohibitions are documented in several statutes.

Forecasting of floods and their impacts, Sub-function 4.5, is addressed in a single legal document stating that JVA's major responsibilities are planning and implementation of flood protection works.

REGULATING WATER RESOURCES AND SERVICES

Monitoring and enforcing water service standards and water quality regulation are broadly addressed. The quality of service and health impacts are key components. Sub-functions 5.2 and 5.3 are prominent in Jordan's policy material. Overall, Sub-function 5.3 is the most significant sub-function developed.

Table 9: Policy and Legal Scores for Function 5, by sub-function; grey tones correspond to the following scoring intervals, from lighter to darker levels of shading: 1.0-1.9, 2.0-2.9, 3.0-4.0.

Sub-functions	Policy Score	Legal Score
5.1 Issuing and monitoring operating concessions to water service providers	2	1
5.2 Enforcing withdrawal limits associated with water rights	4	3
5.3 Regulating water quality in waterways, water bodies, and aquifers (including enforcement)	4	4
5.4 Protecting aquatic ecosystems	2	2
5.5 Monitoring and enforcing water service standards	2	2
Average Function 5	**2.8**	**2.4**

Sub-function 5.1, issuing and monitoring operating concessions to water service providers, emerges in the policy material in conjunction with discussions of expanding private sector participation. It is minimally established in the legal documentation.

Sub-function 5.2, enforcing withdrawal limits associated with water rights, is communicated in policy documents through observation wells, meters, tracking, measurement, regulation and enforcement of illegal use. Focus is on groundwater resources. Fines and other punishments are addressed in the legal material, and state ownership and rights to water continue to receive emphasis.

Sub-function 5.3, regulating water quality in waterways, water bodies, and aquifers (including enforcement), focuses heavily on human health protection. Policy documents address drinking water, waste disposal, and irrigation water quality standards. Legally, punishments for polluting the resources are outlined.

Sub-function 5.4, protecting aquatic ecosystems, and the protection of the environment in general, is seldom addressed. Environmental protections appear to be mainly directed at marine rather than freshwater environments. A few legal documents set content loads for potentially harmful inputs to freshwater.

Sub-function 5.5, monitoring and enforcing water service standards, is specific to service providers. Though policy documents cover the topic of setting standards, measures to monitor and enforce such standards are not clearly conveyed, through either policy or legal material.

5.2 PROCESS FEATURES

Table 10 shows the results of the policy and legal scorings, expressed on a 1-4 scale (4 maximum value).

Table 10: Policy and Legal Scores for the five process features; grey tones correspond to the following scoring intervals, from lighter to darker levels of shading: 1.0-1.9, 2.0-2.9, 3.0-4.0.

	Policy Score	Legal Score
Transparency	3	3
Participation	4	1
Accountability	2	2
Rule of Law	2	1
Responsiveness	4	2

TRANSPARENCY

Among the policy documents, a primary argument for decentralizing water management is overall institutional transparency. The importance of information dissemination pertaining to water and water service data, including the true costs of water and population pressures on water resources, is emphasized. Transparency, as it emerges in the legal documentation, takes the form of public notices of legal formulations and amendments related to water resources.

PARTICIPATION

Jordan's policy documents indicate a strong intent to shift toward greater participation, but legal evidence is lacking. Establishment and enhancement of WUAs, including legitimizing legislation, is advocated in several documents. Participatory long-term planning at the administrative level and efforts to increase input from relevant stakeholders is addressed. Additionally, decentralization and community empowerment are stated goals.

ACCOUNTABILITY AND INTEGRITY

In the policy and legal documentation, accountability for future actions and decisions is established through open public dissemination. Key considerations in policy material include environmental and societal impact assessments, with an emphasis on pre-project planning. Avoidance of conflicts of interest, through separation of water services and water monitoring responsibilities, is noted as well. Legally, several of the Jordanian Standards require impact assessments, standardized reporting of risky activities are mandated, and a water quality assessment protocol is presented. Provisions related to anti-corruption mechanisms are also present.

RULE OF LAW

Rule of Law was identified in one policy document, and no legal documents. The WAJ Strategic Plan lists equality and justice as values for the WAJ to uphold in fulfilling its water management responsibilities.

RESPONSIVENESS

Responsiveness is the most commonly addressed governance process feature within the legal and policy documentation. Jordan clearly aims to respond to the changing needs of its citizenry, evidenced coherently in policy documents as mandates to review and modify laws and policies. The policies emphasize a service-oriented approach, looking to citizen approval and cooperation to maintain satisfaction in the water service sector for long-term viability. Engaging the private sector to respond to public interests and demands is a clear goal as well. In the legal material, many examples are present, including institutional restructuring and wastewater legislation. Public interest and social and economic factors are frequently used to legitimize licenses and prohibitions.

5.3 CROSS-CUTTING CATEGORIES

WATER SOURCES

Of the three general water sources, surface water is addressed the least, overall, though the long-term planning documents address the necessity for conservation. Ground and derivative water sources are the focus of the majority of the policy and legal documents. Irrigation and agricultural development goals emphasize the efficient use of groundwater and the safe use of reclaimed water.

WATER USES

Water use focus is on irrigation, municipalities, and industry. There is minimal or no discussion awarded to the environment, hydropower, fisheries, navigation, recreation or social/religious uses. The highest quality water sources are reserved for municipal and industrial uses. Research priorities for agricultural innovation focus on groundwater conservation and use of derivative water.

5.4 SUMMARY

The three-pronged analysis implemented above offers insight into Jordan's water governance capacity at the national level. While assessment of on-the-ground criteria is crucial for a more thorough evaluation, the document analysis provides a benchmark for determining gaps in governance as well as an enriched understanding of national priorities. Key observations are summarized here.

Jordan has undergone a relatively recent restructuring of the water sector, and has taken steps toward building its institutional capacity. Solid sources of funding for the sector are less clearly defined. Strategic planning puts a heavy focus on data collection and dissemination, as well as innovative management strategies geared toward sustainability of the resource. Jordan is beginning to utilize decision support systems, but this has been very recent. While priority of use is discussed in the policy material, the focus on allocation is legal in nature and reflects state ownership of and rights to water. Jordan places emphasis on shifting some of the maintenance and construction of water infrastructure to the private sector, both as a cost-cutting measure and to stimulate private sector involvement in water development and management. Monitoring and enforcement of water service standards and water quality regulation are broadly addressed, with special attention paid to the quality of service and public health.

Jordan is attempting to make governance decisions – including publication of new laws and policies – more transparent. The government also appears to be moving toward a more decentralized structure, in part by incorporating water user associations (WUAs) into its management plans. This, along with provisions referring to stakeholder involvement, reflects an incipient increased participation. In order to increase accountability, Jordan is now requiring environmental and health impact statements; additionally, anti-corruption provisions are included in some of the material. Responsiveness, though less evident within the documents, is demonstrated through reorganization of the water sector and a move towards adapting to the changing social structure, economy, and environment.

It is clear that groundwater resources are highly valued, and that wastewater reuse will become increasingly necessary in the coming years. Surface water is less referenced, even though surface water in Jordan is critically scarce. Public health and maintaining current agricultural practices are top priorities, as are industrial practices and tourism.

6. EXPERT-BASED WATER GOVERNANCE RATING

This section presents the results of the water governance assessment undertaken in a Rating Session held in Jordan in June 2010, attended by 21 experts belonging to different water-related organizations (Annex 2). The following analysis considers the experts' perception of effectiveness of the Jordanian water sector in the current (2010) and past (1997) performance of the five standard water governance functions. The year 1997 was selected as a reference date due to the approval of the Water Strategy for Jordan and several new water-related policies in that year (Groundwater Management Policy, Wastewater Management Policy, and Water Utility Policy).

Also analyzed is the extent to which five good governance decision-making features are present in decision-making related to key water challenges.

6.1 FUNCTIONAL EFFECTIVENESS RATING

Table 11 presents averaged participant responses aggregated by function for the functional effectiveness exercise.[7] Table 12 contains average scores drawn from the 20 questions in the functional effectiveness exercise. Standard deviations are shown in Annex 3.

Table 11: Aggregated responses to the functional effectiveness exercise; grey tones correspond to the following scoring intervals, from lighter to darker levels of shading: 1.0-1.9, 2.0-2.9, 3.0-4.0.

	1997	2010
F1: Organizing and building capacity in the water sector	2.4	2.9
F2: Planning strategically	2.6	3.2
F3: Allocating water rights	2.5	2.7
F4: Developing and managing water resources	2.6	3.0
F5: Regulating water resources and services	2.0	3.0

Jordan's strongest feature is Planning. Planning scored 3.2 out of 4 for 2010, demonstrating strong functional effectiveness. *Developing and Managing* and *Regulating* were also strong, scoring 3.0 out of 4 and showing strong improvement relative to 1997. *Organizing* and *Allocating* got slightly lower ratings, scoring 2.9 and 2.7 out of 4 respectively.

[7] Values shown for each function are weighted averages, with equal weights applied to each participant strata (see Fieldwork Protocol at www.rewab.net)

Table 12: Averaged answers to individual questions in the functional effectiveness exercise; grey tones correspond to the following scoring intervals, from lighter to darker levels of shading: 1.0-1.9, 2.0-2.9, 3.0-4.0.

Question		1997	2010
F 1	1. Roles and responsibilities of each department or agency are clearly defined	2.5	3.1
	2. Policy goals for the water sector are clearly defined	2.5	3.4
	3. The water sector is provided with sufficient funds to function properly	2.7	3.0
	4. National governmental agencies consult each other when taking decisions that impact multiple sectors	2.0	2.6
	5. National governmental agencies cooperate in the implementation of their policies where appropriate	2.3	2.7
	6. Regional governmental agencies are consulted when decisions that affect their region are taken	2.4	2.9
	7. Governmental agencies are staffed with sufficient and trained personnel to perform the assigned tasks	2.6	2.7
F 2	8. Future water supply and demand forecasts are based on good quality data	2.5	3.4
	9. Water resources data are collected regularly, continuously throughout the country	2.6	3.3
	10. Current strategies for long-term matching of supply and demand have been effective at matching supply and demand	2.5	3.0
F 3	11. Rules and procedures for assigning and recording water rights are clearly defined and functioning	2.4	2.7
	12. Rules and procedures for transferring water rights are clearly defined and functioning	2.3	2.8
	13. Disputes among water users are resolved effectively	2.3	2.8
F 4	14. Government agencies are effective at forecasting seasonal supply and demand and matching the two	2.5	3.2
	15. Government agencies effectively operate public water infrastructure	2.6	3.3
	16. Government agencies effectively maintain public water infrastructure	2.6	3.1
	17. Current incentives and sanctions (including water pricing) are effective at achieving long and short term supply/demand matching	2.4	2.6
F 5	18. Government agencies are effective at enforcing withdrawal limits that are established	2.1	3.8
	19. Official water quality standards in waterways are met	2.2	3.0
	20. Aquatic ecosystems are protected to the level specified by the government	1.9	2.6
	AVERAGE	**2.5**	**3.1**

Substantial progress in Jordan's water sector in the last 13 years. The consulted experts perceived an improvement in the performance of all functions from 1997 to 2010. Jordan has devoted a major effort to improve its water management during the last 10 years, and this push may be responsible for the substantial increase seen in survey results.

Organizing and building capacity in the water sector. This is the second weakest function (and with a limited improvement, from 2.4 in 1997 to 2.9 in 2010). The strongest sub-function was the definition of policy goals (Table 12, q. 2), which received a 3.4, the second strongest score of any individual sub-function. Sub-functions related to the assignment of roles and responsibilities among governmental departments or agencies and to securing and allocating funding to the water sector (Table 12, q. 1 and 3) both received around 3 out of 4, showing both strength in 2010 and strong improvement since 1997. The other four sub-functions were weaker, each receiving less than 3 out of 4, with limited coordination among national government agencies particularly noteworthy.

Planning Strategically. *Planning Strategically* was one of the strongest functions in 1997 and remained so in 2010. Its overall score of 3.2 was bolstered by all the assessed sub-sections (Table 12, q. 8-10). Each sub-function scored 3.0 or above, with a simple average of 3.2 overall. Each sub-function also saw significant improvement from 1997 to 2010, showing that this area has received concentrated attention over the last 13 years.

Allocating Water Rights. Allocating water rights was the weakest function overall in 2010, and was the second weakest in 1997. The lowest sub-score awarded by the expert panel was related to the definition and application of procedures for assigning and recording water rights, which scored a 2.7 out of 4 (Table 12, q.11). The other two sub-functions both scored slightly higher, but all three were relatively weak.

Developing and managing water resources. This function was the second strongest in 2010 and showed a marked improvement over the last 13 years (from 2.6 to 3.0). Two of its sub-functions were particularly strong – forecasting seasonal supply and demand and matching the two, and operating and maintaining public water infrastructure according to established plans and strategic priorities (Table 12, q. 14-16). Each of these sub-functions scored between 3.1 and 3.3 out of 4, and each saw a significant performance increase since 1997. The weakest sub-function in *Developing and managing* was the application of incentives and sanctions to achieve long- and short-term supply/demand (including water pricing), which received only a 2.6 out of 4, one of the weakest sub-functions overall (Table 12, q.17).

Regulating water resources and services. Participants rates this function as one of the strongest, though it had some of the greatest variation among sub-functions. The enforcement of withdrawal limits associated with water rights scored 3.8 out of 4, while performance in 1997 was rated only a 2.1. On the other hand, the protection of aquatic ecosystems was the weakest sub-function overall, with a score of 2.6. However, this was also the only sub-function that scored below a 2 some 13 years ago, and it has seen some improvement.

6.2 RATING OF PROCESS FEATURES

At the Rating Session, participants were also asked to consider the extent to which five features were present in decision-making in response to five key water sector challenges (see Section 2).

The aggregated values of the averaged answers, by challenge and process feature, are presented in Table 13. The scale ranged from 1 to 4. A 1 indicates that the strength of a particular governance feature is low, and 4 indicates that the strength of a particular governance feature is high.

Table 13: Averaged ratings of decision process feature; grey tones correspond to the following scoring intervals, from lighter to darker levels of shading: 1.0-1.9, 2.0-2.9, 3.0-4.0.

	Participation	Transparency	Integrity and Accountability	Rule of Law	Responsiveness	Average
1. Drinking Water	1.8	1.8	2.6	1.5	1.5	1.8
2. Ground Water	2.1	2.1	2.2	2.9	3.0	2.5
3. National Water Policy	2.1	2.5	2.1	3.2	3.1	2.6
4. Water Quality	1.9	2.3	2.5	3.0	3.2	2.6
5. Matching supply-demand	2.2	2.3	2.4	2.9	3.0	2.6
Average	**2.0**	**2.2**	**2.4**	**2.7**	**2.8**	

Wide variance among Jordan's governance features. *Responsiveness* and *Rule of Law* were by far the strongest features, the only two that scored over a 2.5 overall. Rule of Law had the highest score on the chart in the National Water Policy challenge and tied for lowest score in the Drinking Water challenge. Responsiveness also shared a score of 1.5 in the drinking water challenge, but scored above 3 in every other challenge area. The *Integrity and Accountability* feature had relative parity among scores, but its weakest challenge area was one in which most other process features were strong – National Water

Policy. Transparency was the second weakest feature, averaging 2.2 out of 4. Its weakest challenge was Drinking Water, and its strongest was National Water Policy. Participation was by far the weakest feature, averaging only 2 out of 4. It had two different challenges that scored below a 2 – Drinking Water and Water Quality.

Challenges were relatively evenly addressed by governance features, except for the Drinking Water challenge, which was by far the weakest challenge area, averaging only 1.8 out of 4. *Rule of Law* and *Responsiveness* both only scored 1.5 out of 4 in this area, and *Participation* and *Transparency* each only scored 1.8. Interestingly, *Integrity and Accountability* received its highest score in this challenge, which may be a function of the extensive private sector involvement in the drinking water sub-sector. Each of the other challenges had similar scores across governance features. Water Quality had the only other score below 2 outside of the Drinking Water challenge.

6.3 SUMMARY

Jordan has varied functional effectiveness, though, on average, each function scored relatively high with the exception of *Allocation*. Furthermore, Jordan saw improvement across the board in each function and sub-function. In the expert-based assessment for 2010, Jordan's strongest function was *Planning Strategically* and the weakest was *Allocating Water Rights*. Governance decision process features had substantial variability across challenge areas – *Responsiveness* was the strongest feature, followed closely by *Rule of Law*. By far the weakest feature was *Participation*. Drinking Water was the challenge that was least adequately characterized by good governance decision-making features, averaging less than 2 out of 4.

7. DISCUSSION AND CONCLUSIONS

The analysis presented in this report strives to give an overview of water governance in Jordan using a rigorously developed conceptual framework. When combining the results of the different analytic tools within the framework, interesting trends emerge. These observations do not purport to provide detailed diagnoses of the causes of problems identified, or "recipes" for change. Instead, they aim at (a) spurring discussion of problem drivers based on a standardized assessment of current water governance practices, and (b) identification of ways to improve water governance in Jordan.

7.1 AREAS WITH HIGH CAPACITY

Overall, the analysis of Jordan's P&L documents suggest that the country has quite well-developed water policies, while the legal instruments still do not fully support such policies. The EBA shows relatively good performance in implementing the available policies and laws.

Jordan has high capacity for Function 1, *Organizing and Building Capacity*, demonstrated through relatively but consistently high policy and legal scores (3.4 and 2.7), a moderate expert-based rating (2.9), and significant collective organizational involvement (eight organizations out of 13 rating above 2, with MWI influencing decisions the most). Within this broad function, higher capacity is found in creating an organizational structure and assigning roles and responsibilities (scores above 3). Another strong area within this function is ensuring funds to the water sector (score of 3 in the policy, legal and expert-based assessment). Though Jordan does prioritize producing well-trained personnel in its policy documentation (score of 3), this is a key challenge and potential barrier to successful decentralization of water management, as shown in the relatively low EBA (2.7) and legal scores (score of 2) for this issue. Regarding the sub-function of setting national policy goals for the water sector, the assessment suggests that the policies are clearly defined (score of 4 in policy analysis, 3.4 in EBA) but still need to be fully incorporated into legal documents (legal analysis score of 2).

High capacity is also evident in Function 4, for constructing or authorizing private and public infrastructure (4 in policy documents and 3 in the legal ones), and operating and maintaining public infrastructure (scores over 3 in all the assessments). Interestingly, incentives to achieve an efficient use of water are well developed in documents (4 and 3 in policy and legal documentation) but they are perceived to be poorly performed in practice (EBA of 2.6). The Ministry of Water and Irrigation is the main actor in Function 4, with some influence by the Ministry of Agriculture and donor organizations.

Overall, Function 2, *Planning Strategically,* is strong in policy documents (4 in policy analysis) and perception (3.2 in EBA) but has little presence in the legal texts (1.7). This, however, is not surprising as planning is typically a policy-related function. The only sub-function related to planning where Jordan gets scores over 3 across the board is collecting, storing, and utilizing water data. Decisions related to Function 2 seem to be dominated by the Ministry of Water and Irrigation and, to a lesser extent, by the Ministry of Agriculture, Donors, and the Royal Court.

In the EBA, *Rule of Law* and *Responsiveness* are perceived as high in relative terms but not in absolute terms (2.7, 2.8). *Responsiveness* is widely addressed in the Jordanian policy documents and only partially supported by legal evidence.

7.2 POTENTIAL CHALLENGES

Overall, the broad function of A*llocating Water* (Function 3) may present the greatest challenge in Jordan, with little overall attention to this topic in the policy documents (1.5), moderate support in the legal texts (2.5), and relatively low scores in the EBA (2.7). In particular, mechanisms for water trades and the complimentary conflict mitigation are only marginally addressed in the P&L documents (scores of 2 or 1). The most recent policy document, the National Water Demand Management Policy, does state the MWI's intent to introduce a mechanism for water rights trading, but, for the time being, laws do not reflect this demand-side approach. As a positive note, the legal provisions for awarding water rights and adjudicating disputes related to them are quite well developed (legal score of 3). However, the performance of those legal arrangements in practice (2.7 and 2.8 in EBA) seems to be improvable. Decisions related to this function are dominated by the MWI, with some influence by the agencies that regulate the two main water uses: the Ministry of Agriculture and Water Utilities.

Function 5, *Regulating Water Resources and Services*, has a limited presence in documents (2.8 and 2.4 for policy and legal scores respectively), which, however, does not seem to negatively affect the overall function performance in practice (3 in EBA). When analyzing the results for the individual sub-functions within Function 5, several challenging areas can be detected. Although the assessment suggests high capacity for enforcing water rights limits (4 in policy, 3 in legal, and 3.8 in EBA) and regulating water quality (4 in P&L and 3 in EBA), the protection of ecosystems and the enforcement of water service standards seem to be areas still needing effort, as shown by relatively low presence in the P&L documents (2) and the perceived low performance in practice (2.6 EBA score for ecosystems protection). Similarly, issuing concessions to water service providers lacks sound coverage among the documentation (2 and 1 in policy and legal analysis). According to the O&F matrix, the main governmental actors usually having a stake in regulating water and water services (Ministry of Water and Irrigation, Ministry of Agriculture, Ministry of Health and Ministry of Environment) are all significantly involved in the decision-making related to this function.

Jordan's policy documents indicate a strong intent to shift toward greater participation in the water sector (score of 4), but legal evidence is lacking (score of 1) and the EBA suggest that participation is still insufficient in practice (2.0 in EBA). Also, the O&F matrix suggests that participation is only incipient, as shown by the fact that the influence of the civil society (NGOs and the private sector) score over 2 only in one function. In terms of *Transparency*, Jordan does award substantial attention to this process feature within both policy and legal documents, but efforts appear needed to translate these provisions into practice (2.2 in EBA). Finally, *Integrity and Accountability* shows moderate presence in the P&L documentation (score of 2) and similar moderate performance in practice (2.4 in EBA).

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ANNEX 1. POLICY AND LEGAL DOCUMENTS

Date	Document Type and Title
	Policy
2008	Water Authority Strategic Plan 2008-2011
2007	National Water Demand Management Policy
2006	Drinking Water Resources Protection Guidelines
2006	Irrigation Equipment and System Design Policy
2006	Irrigation Water Allocation and Use Policy
2004	National Water Master Plan
1998	Irrigation Water Policy
1997	Groundwater Management Policy
1997	Wastewater Management Policy
1997	Water Strategy for Jordan
1997	Water Utility Policy
	Legal
2006	Environmental Protection Law No. 52*
2003	Regulation No. 76: A Regulation in Amendment of the Groundwater Control Regulator
2002	By-Law No. 85: Underground Water Control By-Law
2002	Jordanian Standard No. 893: Water – Reclaimed Wastewater
2002	Provisional Law No. 44: Law of Agriculture*
2002	Temporary Public Health Law No. 54*
2001	Law No. 30: Jordan Valley Development Law
1998	Jordanian Standard No. 287: Drinking Water - Methods of Sampling
1997	Jordanian Standard No. 286: Drinking Water Standards
1996	Jordanian Standard No. 1145: Uses of Treated Sludge in Agriculture
1992	Administrative Organization Regulation for the MWI No. 54
1992	General Specifications for Water Mains and Distribution Systems and Appurtenances
1991	Jordanian Standard No. 202: Requirements for Discharges of Industrial Effluents
1988	Law No. 18: The Water Authority Law and Amendments

ANNEX 2. WORKSHOP AND RATING SESSION: LIST OF PARTICIPANTS

Participant	Organization	Strata
Eba'a Al Isa	Ministry of Planning and International Cooperation	National Policy Makers
Mohammad Abadi	Ministry of Health	
Mufleh Al Abbadi	International Union for Conservation of Nature	Advisors
Tarek Abu Alhawwa	Spanish Agency for International Development Cooperation	
Maha Zoubi	UNDP	
Mr. Rami Salameh	MercyCorps	
Waleed Suker	Water Authority of Jordan	Water resources
Suzan Kilani	Water Authority of Jordan	
Ali Soboh	Ministry of Water and Irrigation	
Isam Rimawi	Ministry of Water and Irrigation	
Mohammad Momani	Ministry of Water and Irrigation	
Mohammad Atrash	Ministry of Water and Irrigation	
Ziad Darwish Taqash	Ministry of Water and Irrigation	
Wa'el Rashdan	Ministry of Agriculture	Irrigation
Luna Al-Hadeidi	National Center for Agricultural Research and Extension	
Ghada Al-Naber	National Center for Agricultural Research and Extension	
Khalil Absi	Jordan Valley Authority	
Ahmad Aloweidi	Ministry of Agriculture	
Salameh Mahasneh	Northern Governorate Water Authority	Other Water Using Sectors
Suleiman Ghezawi	Farmer-Jordan Valley	
Suha Mustafa	Jordan Chamber of Industry	
Abeer Saleh	Jordan Chamber of Industry	

ANNEX 3. STANDARD DEVIATIONS OF THE EXPERT-BASED ASSESSMENT

Question		1997	*SD*	2010	*SD*
F 1	1. Roles and responsibilities of each department or agency are clearly defined	*2.5*	*0.6*	*3.1*	*0.6*
	2. Policy goals for the water sector are clearly defined	*2.5*	*0.7*	*3.4*	*0.8*
	3. The water sector is provided with sufficient funds to function properly	*2.7*	*0.7*	*3.0*	*0.6*
	4. National governmental agencies consult each other when taking decisions that impact multiple sectors	*2.0*	*0.6*	*2.6*	*0.7*
	5. National governmental agencies cooperate in the implementation of their policies where appropriate	*2.3*	*0.7*	*2.7*	*0.9*
	6. Regional governmental agencies are consulted when decisions that affect their region are taken	*2.4*	*0.6*	*2.9*	*1.0*
	7. Governmental agencies are staffed with sufficient and trained personnel to perform the assigned tasks	2.6	*0.5*	*2.7*	*0.8*
F 2	8. Future water supply and demand forecasts are based on good quality data	2.5	*0.6*	*3.4*	*0.6*
	9. Water resources data are collected regularly, continuously throughout the country	*2.6*	*0.6*	*3.3*	*0.6*
	10. Current strategies for long-term matching of supply and demand have been effective at matching supply and demand	*2.5*	*0.5*	*3.0*	*0.9*
F 3	11. Rules and procedures for assigning and recording water rights are clearly defined and functioning	*2.4*	*0.6*	*2.7*	*0.8*
	12. Rules and procedures for transferring water rights are clearly defined and functioning	*2.3*	*0.8*	*2.8*	*0.8*
	13. Disputes among water users are resolved effectively	*2.3*	*0.6*	*2.8*	*0.7*
F 4	14. Government agencies are effective at forecasting seasonal supply and demand and matching the two	*2.5*	*0.5*	*3.2*	*0.5*
	15. Government agencies effectively operate public water infrastructure	*2.6*	*0.5*	*3.3*	*0.6*
	16. Government agencies effectively maintain public water infrastructure	*2.6*	*0.5*	*3.1*	*0.6*
	17. Current incentives and sanctions (including water pricing) are effective at achieving long and short term supply/demand matching	*2.4*	*0.7*	*2.6*	*0.8*
F 5	18. Government agencies are effective at enforcing withdrawal limits that are established	*2.1*	*0.6*	*2.8*	*0.7*
	19. Official water quality standards in waterways are met	*2.2*	*0.6*	*3.0*	*0.6*
	20. Aquatic ecosystems are protected to the level specified by the government	*1.9*	*0.7*	*2.6*	*1.0*

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