AN ABSTRACT OF THE THESIS OF

Bridget N. Brown for the degree of Master of Science in Water Resources Policy and Management presented on August 2, 2010.

Title: Assessing Water Governance Capacity in MENA: Applying an Institutional Document Analysis Approach to Jordan.

Abstract approved:

Aaron T. Wolf

Water governance has been identified as a crucial component to improving conditions and balancing supply and demand of water resources in the water-scarce Middle East North Africa (MENA) region. Finding a method for, and commencing the process of, evaluating water governance is thus imperative. This study analyzes the potential to assess national capacity for water governance through analysis of institutional legal and policy documents relevant to water resources, using Jordan as a case study. Usefulness and completeness of the methodology, as well as findings for Jordan are presented. Several elements of the analysis framework applied appear to be analyzable using this method; others may be ambiguous or require an alternate mode of assessment, such as government or citizen perceptions. Of the analyzable elements of water governance, Jordan demonstrates high capacity for organization in the water sector, water quality regulation, enforcement of water rights limits, infrastructure development and maintenance/operation, use of incentives and sanctions, and collecting and utilizing water data. There is also some evidence that Jordan is moving toward a more participatory and transparent governance process. Potential challenges exist for allocation, particularly where water rights trades are involved, as well as water service related responsibilities, such as enforcing standards and issuing concessions to private service providers.

Assessing Water Governance Capacity in MENA:
Applying an Institutional Document Analysis Approach to Jordan

by

Bridget N. Brown

A THESIS

submitted to

Oregon State University

in partial fulfillment of
the requirements for the
degree of

Master of Science

Presented August 2, 2010

Commencement June 2011

Master of Science thesis of Bridget N. Brown presented on August 2, 2010.

APPROVED:

Major Professor, representing Water Resources Policy and Management

Director of the Water Resources Graduate Program

Dean of the Graduate School

I understand my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Bridget N. Brown, Author

ACKNOWLEDGEMENTS

I would like to thank my advisor, Dr. Aaron Wolf, for providing me the opportunity to work with him these last two years. Because of him, I am taking with me far more knowledge and experience than I ever hoped to acquire in a Master's program. I am extremely grateful, above all, that he believed in my abilities enough to include me in this project so integrally. I would also like to thank Dr. Brent Steel for serving on my committee, helping me refine the methodology and, most importantly, for approaching me to work on this project in the first place. Thank you as well to Dr. Todd Jarvis, for introducing me to "data synthesis" and serving on my committee. Without the insightful feedback from my committee members, this paper would not be the masterpiece it is. In addition, I want to offer a special thank-you to Dr. John Simonsen for serving as my graduate representative.

I owe much gratitude as well to the entire Rewab team, and in particular Mark Svendsen, for his leadership on the project. Also on the Rewab team, I would like to thank Lucia De Stefano, Paris Edwards, Michael Campbell, Kristin Chatfield, Sarada Tangirala, Rebecka Daye, and Majed Atwi Saab for their contributions to methodology, analysis, and writing on the project. Thank you as well to Gabriel Eckstein for sharing his expertise on legal language with me, which helped immensely with the quantitative analysis. Additionally, database support from Geoff King, Jehan Jabareen, and Carolyn Jackson has been invaluable. And finally, the feedback and contributions from Jonathan Lautze and Luke Sanford at International Water Management Institute is much appreciated.

I also want to thank my wonderful friends in Corvallis – especially my peers in Geosciences and the Water Resources Graduate Program and my roommates – for providing friendship and support to me throughout graduate school, as well as Aaron for his recent and much appreciated encouragement. Finally and certainly not last, I want to thank my mom, dad, sisters Kristen and Debbie, and my good friend Terri, who have all provided invaluable support from afar over the last two years.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Assessing Water Governance Capacity in MENA: Applying an Institutional Document Analysis Approach to Jordan

Introduction

Water governance has been identified as a crucial component to improving conditions and balancing supply and demand of water resources in the water-scarce Middle East North Africa (MENA) region. At the national level, the water institution should thus be prepared for and highly capable of governing the many facets of water resources. In recent years, there has been debate surrounding how measurable water governance actually is. Considering the emphasis placed on it, determining a method for its regular evaluation seems imperative. Likewise, as climate change along with other factors are worsening already poor conditions, commencing the evaluation process is important, to equip water institutions in the region with the necessary knowledge to move forward proactively.

This study evaluates the potential to assess national capacity for water governance through analysis of national legal and policy documents relevant to water resources. Jordan, an extremely arid country in the Middle East, is used as a case study. The Regional Water Governance Benchmarking Project (Rewab)'s framework for good water governance, developed by our team of researchers from Oregon State University, International Water Management Institute (IWMI), and International Resources Group (IRG), is applied to the collection of policy and legal documents provided by Jordan to explore if and how specified elements of water governance manifest in the documentation. Results for Jordan are then compared to results for Egypt, for which the same methodology was used, to demonstrate if and how this approach to analysis reveals variation. Then, results from a complimentary analysis for Jordan are compared with its document analysis, to explore how complete of a picture the institutional document analysis approach provides for understanding water governance capacity. Finally, an assessment of Jordan's capacity for water governance, based on the institutional document analysis, is provided, and local as well as regional implications are discussed. Specifically, the following questions are explored:

1) Can institutional documents be used to assess water governance?
    - Do results show variation, and how?
    - How much of the overall governance story is told by looking at the documents alone?
2) If so, what is the capacity for water governance in Jordan, based on assessment of national laws and policies?
    - Where is capacity high?
    - Where are challenges present?
    - Where is uncertainty or other findings of interest evident?
3) What does this study contribute to our understanding of water governance in MENA?

Background and Justification for Research

Regional Concerns Over Water Resources

The Middle East North Africa (MENA) region – which joins the northern coastal countries of Africa from Morocco to Egypt with the Middle East region (Figure 2.1) – is the most water scarce region in the world (World Bank, 2007). A variety of geographic and climatic factors equate to poor and declining water conditions here. Probably the most glaring challenge the region faces is its lack of surface water supplies—freshwater accounts for less than 1 percent of the surface area in most MENA countries (UNFAO, 2009). The only two major rivers that dissect the region—the Nile and the Tigris-Euphrates—are drawn down to their limits (Allam and Allam, 2007), are degrading significantly in quality, and are shared among multiple countries. Exacerbating conditions is the highly variable nature of rainfall, both spatially and temporally, in many areas (World Bank, 2007). Scarcity in surface supplies has resulted in unsustainable groundwater pumping, which in turn has led to aquifer depletion and water quality degradation due to saline intrusion (Nimah, 2008). Added to these concerns is the fact that demands on water resources will surely increase due to population growth, urbanization, and industrialization (Beaumont, 2002), while supplies will likely decrease due to climate change and desertification (UNCCD, 2008).

Currently, nearly all countries in the MENA region are considered "water scarce," defined as having less than 1000 cubic meters per capita of renewable freshwater supplies (Morrissette and Borer, 2004). This is the amount of water the United Nations has declared as the minimum needed for each person to drink and grow enough food to eat (Donkor, 2006). Scarcity is typically the most severe for rural residents. A major gap in access to safe drinking supplies exists between rural and urban areas; in 2004, rural residents had 13 percent less access than urban residents, on average (El-Batran, 2008). In coming years rural areas will face an even greater challenge with access, as industrialization and economic growth will cluster around urban areas, which, as a result, are likely to receive greater policy attention from national governments.

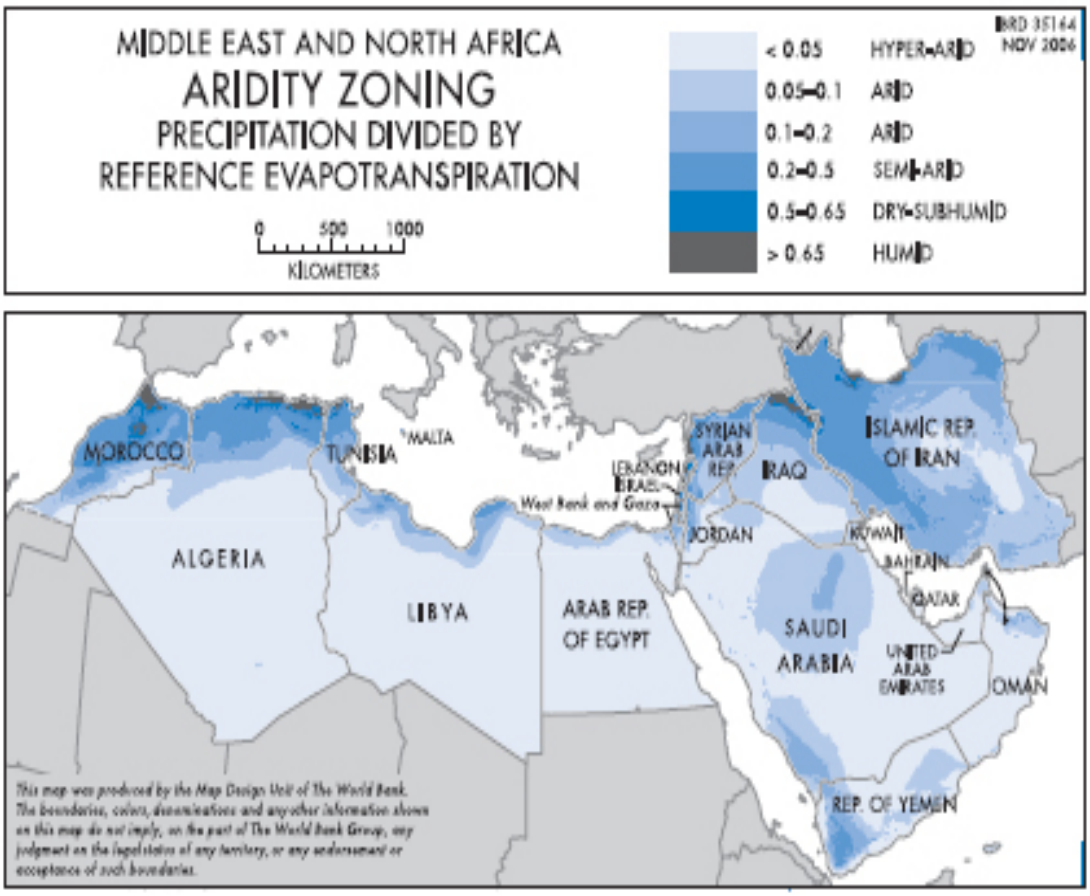

Figure 2.1. Map of the MENA region, displaying spatial distribution of the ratio of precipitation to evapotranspiration (World Bank, 2007).

Per capita freshwater supplies are expected to rapidly decline due to population growth and climate change, yet certain sectors of the economy will require more water in coming years. The urban growth pattern in the region suggests that demand from the municipal sector will increase. Urban populations are already high and are expected to reach a regional average of 66 percent by 2015 (Faruqui, Biswas and Bino, 2001). Additionally, industry and tourism—the two main sources of economic growth in the region aside from oil—are gaining momentum. Consequently, MENA countries will have to increase water supplies to urban, industrial and tourism areas. This will no doubt mean reducing supplies to the agricultural sector (Beaumont, 2005), as it consumes a high proportion of the resources.

It is expected that this will further marginalize poor rural populations (Haddadin, 2001).

As demand for water resources heightens, the status of food security becomes an increasing issue (van Vierrson, 2005). In the arid MENA region, food production is not possible without irrigation (Haddadin, 2001). Despite this fact, up until 1970 most MENA countries were food self-sufficient (Morrissette and Borer, 2004). This is no longer the case, and population growth alone will require countries to increase agricultural food production by 3 to 4 percent per year (Khdier, 2005). As water supplies dwindle, countries in the MENA region must either adapt their agricultural practices so as to both increase production and decrease water consumption, or increasingly rely on other countries for food imports, (van Vierrson, 2005). The first alternative would incorporate demand management strategies: investment in conservation technology and practices, and the use of lower quality water for irrigation. Traditional agricultural technology results in significant water losses (Saleth and Dinar, 2004), but modern technology exists that has the potential to improve water use efficiency by up to 95 percent (Postel, 1999), though this comes with great economic costs. Even small improvements in efficiency, though, can allow for significant expansion of irrigated land area (Postel, 1993). Available water can also be more widely distributed if crops that thrive in arid conditions, as opposed to water thirsty crops, are grown. In addition, incorporating greywater (household wastewater not derived from toilets) and treated wastewater into irrigation practices can relieve demand (van Vierrson, 2005). In the 1960's Jordan and Israel began treating and using greywater and wastewater; this water has become increasingly important for agriculture in MENA (McIlwaine and Redwood, 2010).

An alternative or complimentary approach is to increase food imports, which has become a common strategy to offset water shortages in arid regions. This is sometimes referred to as importing "virtual" water (Brooks, 2007). By importing virtual water water-scarce nations can escape the impossible feat of supplying both water and food to their growing populations, and instead focus on economic growth and diversification. Virtual water trading is possible in large part because of the disparity in precipitation between exporting and importing countries. Major exporters of wheat, corn and soybeans rely primarily on rainfall ("green" water) for irrigation, while major importers require application of precious surface and ground water ("blue" water) (Aldaya, Allan and Hoekstra, 2010), thus limiting the use of these resources in other sectors of the economy. Egypt serves as a prime

example, as nearly all of its domestic crops are produced with water from the Nile River. Because Egypt now imports wheat from countries that include the U.S. and Australia, it is able to save about 7 percent of its allocated shares of the Nile each year (Chapagain, Hoekstra and Savenije, 2006). Although this is a promising solution to both food security concerns and agricultural water demand, challenges are present as well. For example, accessing virtual water in the global market may require a minimum level of socio-economic development (Allan, 2006). Additionally, agricultural subsidies in the U.S. and E.U., inadequate water pricing structures, and lack of appropriate international trade agreements all pose challenges to successful global implementation of virtual water trading (Aldaya et al, 2010).

Water Governance

The water situation in the MENA region is unique and clearly extremely complex. It has been demonstrated that solutions to the water supply and quality issues here cannot be solely technological – infrastructure in the region is not lacking, yet problems persist (IRG et al, 2009). Many have suggested that it is actually water governance, and not scarcity, that must first be addressed in order to solve the impending water crisis (IRG et al, 2009). Regardless, governance has been identified on numerous occasions as a key consideration for dealing with water resources issues (UNESCO, 2003).

The definition of water governance is still evolving, and depending on the scope can refer exclusively to official governing entities, or be more broadly applied to society as a whole (UNESCO, 2003). Additionally, some view it as synonymous with water management, while others see it as more focused on relationships between a government, its citizens and the environment (UNESCO, 2003). It has been described as "[embracing] the relationships between government and societies… stressing the importance of involving more voices, responsibilities, transparency and accountability of formal and informal organizations associated [with] any process" (Tartajada, 2007). The United Nations Development Program (UNDP) defines governance as "the exercise of economic, political, and administrative authority to manage a country's affairs at all levels" (UNDP, 1997). UNESCO (2003: 372), in tailoring this definition to be water-specific, defines it as "comprising all social, political and economic organizations and institutions, and their relationships, insofar as these are related

to water development and management." This definition shares many fundamental concepts with the Integrated Water Resources Management (IWRM) approach to water governance, which is the prevailing approach applied today toward improving water management and governance globally.

IWRM, promoted by organizations such as the Global Water Partnership (GWP) and the United Nations (UN), among others, is a model for water governance that attempts to incorporate social, economic and environmental dimensions, through coordinated and integrated planning and development. IWRM is defined by the GWP as "a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems" (GWP, 2008). In short, IWRM encompasses three basic values: equity (the social dimension), efficiency (the economic dimension), and sustainability (the environmental dimension) (GWP, 2008). IWRM aims to embrace these three values through coordination/integration and subsidiarity (GWP, 2008).

IWRM is thus primarily a process-oriented approach, promoting certain ethical and logistical considerations for how decisions over water resources ought to be made. Some argue that process-related goals are not measurable (Molle, 2008) or that the terms themselves are ambiguous (Biswas, 2004). For example, determining when water resources management is actually "integrated" is difficult without precisely defining what is meant by integration (Biswas, 2004). In recent years, IWRM has also received criticism for failing to adequately address groundwater (Braune and Xu, 2008). It has been stated that the integral connection between surface and groundwater necessitates considering the two as a single resource, if true integration is to be achieved (Cap-net, 2010). Universal application of the concepts is also a source of contention. These concepts in many ways stem from a western context, and some argue they are inappropriate when taken out of that context (Shah, Makin and Sakthivadivel, 2001). However, there is also evidence to suggest some of these elements are applicable in MENA. For example, water user associations (WUAs), emerging in recent years in Egypt, Morocco and Jordan among other countries, incorporate participation, advocated in IWRM initiatives in recent years. Despite ambiguity and debate over which elements should and should not be included, there has been a recent push to incorporate

concepts such as participation, accountability and equity into long-range water strategies and plans.

In addition to process, water governance addresses various functional tasks that guide and impact a relatively large spatial and temporal extent. These should not be confused with the functional tasks of management, which are more routine (IRG et al, 2009) and have less far-reaching consequences. IRG et al (2009) observed that water sectors across a wide range of countries were relatively consistent in the types of functions they performed. For example, water development is generally considered an important functional task associated with water governance. While there is some debate over technicalities of these functional responsibilities, there is general consensus over the broader categories, such as planning, allocation, and enforcement.

For the Rewab project, our team settled on the following definition of water governance, which is used in this paper, defined in IRG et al (2009): water governance is the decision-making that determines the use, management, and distribution of water resources. Inherent in our definition of water governance is the concept of authority, which must be present in order to make decisions over the development, utilization and protection of water resources (IRG et al, 2009). Numerous organizations possess a degree of such authority in the MENA region, but authority is typically relatively centralized, residing in organizations such as ministries, agencies or authorities. In other parts of the world, decentralized decision-making is emphasized. Regardless of the authority dynamics in a given country, it is not disputed that the central government indeed plays a significant role in water governance (IRG et al, 2009). This is not to say that civil society or outside interests should not be considered as key actors. The definition of water governance used here incorporates any actor with authority to make decisions pertaining to water resources. However, a central government, even in highly devolved or decentralized countries, makes decisions that affect lower levels of government, its citizens, and regional and global interests (Jonch-Clausen, 2004). Additionally, and highly relevant to this particular study, many decisions that directly or indirectly affect water are taken at the national level. Examples include decisions "within or between sectors (such as food, health, energy and so on)… and, within the 'water sector,'… [such as] cost recovery" (Jonch-Clausen, 2004). These reasons, combined with the prevalence of central authority

ubiquitous throughout the MENA region, makes assessing water governance from a national perspective a logical approach.

Regardless of governance structure and dynamics, the *water institution* encapsulates these organizations and the manifestations of their authority. Institutions are "structural feature[s] of the society and or polity… involv[ing] groups of individuals in some sort of patterned interactions that are predictable, based upon specified relationships among the actors" (Peters, 2005:18). Inside the water institution are any number of "groups of individuals", referred to here as organizations, with authority to make decisions over water resources. In addition to organizations, according to Saleth and Dinar (2004), the water institution encompasses water law and water policy. Deconstructing the water institution into these three dimensions is "indispensable for developing the analytical framework needed to map, characterize, and evaluate various layers of institutional and performance linkages" (Saleth and Dinar, 2004: 73). Deconstructed, each dimension of the water institution can then be evaluated separately, after which the relationships among the three components can be mapped, ideally resulting in a useful depiction of the water institution as a whole. While IWRM takes a less theoretical approach to evaluating the water institution, it describes similar components. In IWRM, the capacity of the water institution to govern water is contingent upon the "enabling environment" (GWP, 2008). The enabling environment is comprised of both organizations and mechanisms – laws, policies, regulations, etc. – that are in place to make plans over water resources achievable. Depending on the context, the enabling environment can include such organizations as river basin organizations, water agencies or authorities, watershed associations, etc., and such mechanisms as multi-lateral agreements, national laws and policies and sub-national plans.

The water institution may be considered a formal institution, because formal institutions are legitimized by the state (IRG et al, 2009). Informal institutions, on the other hand, are legitimized by conventions or tradition (IRG et al, 2009), defined by Ostrom (2007:23) as "shared concepts used by humans in repetitive situations organized by rules, norms and strategies." Formal and informal institutions interplay with one another in complex ways, and both impact water governance. In the MENA region, culture and religion are both prominent and influential informal institutions. While only the formal water institution is directly examined in this paper, the impact of informal institutions on water

governance – for example, by influencing formal policy and implementability of laws – cannot be disregarded.

The religion of Islam is highly prevalent in the MENA region, and is thus an embedded informal institution. At least 75 percent of each country's population affiliate with this religion; in some countries, up to 99 percent affiliate. Examining the Quran demonstrates the influence that this informal institution may have on water governance. For one, the Quran specifies priority of use: water is allocated first to humans, then animals, and then agriculture (Beaumont, 2005), a concept that is reflected throughout the region, where, in general, water is considered a "social" good. Although agriculture utilizes the highest quantity of water across the region, in most countries, municipal/domestic use is the top priority according to Islamic tradition (Faruqui et al, 2001). The Quran also emphasizes the high value of water. Verses such as "we created from water every living thing" (Faruqui et al, 2001) and "Allah has sent down the water from the sky and therewith gives life to the earth after its death" (Beaumont, 2002) exemplify this point.

Additionally, politics in the region are deeply rooted in a legacy of cultural tradition. In some MENA countries, culture and religion are nearly one and the same; in others, cultural tradition goes beyond religion. For example, Turkey's identity shifted in the 1920's toward a less religious culture to a highly nationalistic culture that identified itself with the West (Cetin, 2004). Civil society groups have protested and influenced policy; this was demonstrated through the 2009 World Wide Water Forum in Istanbul. Cleary then, both religion and culture are influential forces. Thus, informal institutions, though not directly and autonomously analyzed in this study, are incorporated and discussed as potential influences on and barriers to policy and implementation.

The formal water institution is analyzed in this study through examination of two of its three major components: policies and laws. Policies are decisions made by governments (Colebatch, 1998), and in this study include documents referred to as policies as well as others, such as master plans and strategies. Typically, policies precede laws, which legitimize and provide enforcement mechanisms for policies (Iza and Stein, 2009). The term "law" here refers to a variety of legal tools, including statutes, regulations and decrees, among others. Laws formalize policy and, as such, policy not written into law is often considered weaker than policy that is. While it is argued that some policies need not be legitimized by law –

policy that, for example, is widely accepted and practiced as a social tradition – others point out that policies without legal backing have the potential to be "symbolic" policies. Symbolic policies "appeal to our values and our sense of idealism, but do not really deliver any particular benefit, whether they claim to or not" (Birkland, 2005: 150). Laws are thus generally thought of as providing a more solid foundation for carrying out government decisions.

Together, policies and laws "provide the skeleton that is fleshed out by institutions and management practices… when combined with institutions, implementation, and enforcement mechanisms, [laws and policies] constitute a country's 'water governance capacity'" (Iza and Stein, 2009: 18). Laws and policies, when documented, provide written evidence of an institution's past actions and priorities as well as current and future goals, plans, priorities and strategies for action. At the national level, these are referred to as national laws and national policies; these documents can provide a snapshot of where the national government in question stands on a particular issue, such as health care, labor, or the environment, for example, as well as trends over time. Because institutional documents are a direct reflection of an institution, they are a common source of data among qualitative researchers. Wolf, Yoffe, and Giordano (2003) analyzed treaties among countries comprising river basins, to determine the institutional capacity of river basin institutions to prevent conflict over water resources; the results of this study were used to identify which river basins had sufficient capacity and which basins were at risk for conflict. Miller and Dingwall (1997: 77) claim that institutional documents, "warrant study in their own right." Though these documents clearly do not portray all dimensions of an institution, analysis of their text can help illuminate aspects of institutional authority (Miller and Dingwall, 1997). Additionally, documents allow elements of an institution to be studied that may otherwise prove difficult, due to financial, time and scheduling constraints associated with interview and survey methods.

Institutional document analysis is the focus of this paper. The national water institution is analyzed for water governance capacity, by examining national laws and policies originating from the water institution itself. Jordan is used as a case study, and results are compared to results from an Egypt case study. This is one component of a larger regional study, described below, which examines the broader water institution within five MENA

countries, as part of global and regional efforts to enhance water governance capacity in the world's most water-scarce region.

The Regional Water Governance Benchmarking Project

In response to the plethora of water-related issues in the MENA region, the United States Agency for International Development (USAID) solicited a study of water governance in the MENA region. The study, entitled the Regional Water Governance Benchmarking (Rewab) Project, aims to "introduce new approaches [to water governance] that emphasize integrated water conservation and management, collaborative problem solving of water disputes, more efficient and productive use of water, and development of alternative sources of water" (USAID, 2008). The study utilizes a variety of research approaches—quantitative and qualitative, in-country based and desk based—in order to produce a baseline water governance assessment for five countries in the region. The five countries currently participating in the ReWaB project are Morocco, Egypt, Jordan, Turkey, and Oman. The hope is that the study results will provide the respective countries with valuable information on those areas of water governance that are strong and those that may pose challenges.

The Rewab study utilizes three unique methodologies through a common reporting framework, to provide a detailed and thorough depiction of national water governance capacity in each of the five countries. One component is the institutional document analysis, implemented from outside the study countries, which is meant to offer insight, as stated above, into the integrity of institutional documents in terms of water governance capacity. This component was taken on by Oregon State University; I am the Project Coordinator and a key researcher for this component. The remaining two components were implemented in-country by researchers from IRG and IWMI. The first of these is referred to as the "expert-based assessment" (EBA). For the EBA, experts from the water sector of each country, representing a diverse range of perspectives on national water governance, rate their country's water sector on: 1) outcome effectiveness, based on functional performance and 2) features of decision-making, based on process feature incorporation. This component is meant to compliment the institutional document analysis and demonstrate differences between perceptions and existing evidence, as well as reveal some roles that informal laws

and policy may play. The remaining component is an organizations and functions matrix (OF matrix). The functional tasks from the common reporting framework are laid out on a horizontal axis, and all organizations that have authority in water resources decision-making are listed on a vertical axis. During a workshop, experts from the water sector of the study country fill in the matrix, indicating the level of influence each organization has on a particular function. This component illuminates which organization could be turned to for enhancing performance of a particular water governance task, as well as how many organizations are involved in each task. The overall hope of applying three unique and autonomous methodologies is to obtain the most accurate and rich account possible. Ideally, the countries can then take our results and apply them as they see appropriate.

Methods

Jordan as a Case Study

As described above, the five countries chosen for the Rewab project encompass a broad range of hydro-geographical, climatic, and political environments. Per capita renewable freshwater resources (RFW) range from roughly 200 to 3300 cubic meters. Jordan has the lowest RFW of the five countries, estimated to be less than 200 cubic meters; globally, it falls in the top ten for water scarcity (USAID, 2008). As this study utilizes a framework designed for water limited countries in MENA, Jordan presents an opportunity to study a hydro-geographical extreme case.

The hyper-arid climate of Jordan is the basis for most water resource-related concerns, which include desertification, limited surface water supplies, and depleting aquifer levels. The only major river that Jordan has access to, the Jordan River, serves as the geographic border with Israel, and its water, from the main channel and tributaries, is shared among several countries. The major aquifers underlying Jordan, including the Disi, are either transboundary or have been domestically overexploited. The arable land in Jordan is mostly limited to the Jordan Valley, and thus much of the surface water supplies are reserved for irrigation.

Jordan utilizes a centralized governance model, with the majority of decisions concerning water and other resources occurring within federal agencies (ministries). Though historically water resources management was fragmented among multiple sectors, such as environmental, agriculture and industrial, a recent administrative reorganization shifted and streamlined responsibilities into a central water agency, the Ministry of Water and Irrigation (MWI) (MWI, 2009). According to the MWI (2009), its establishment was in response to "Jordan's recognition of the need for a more integrated approach to national water management." The MWI today has the ultimate authority over Jordan's water resources. Under the MWI are two autonomous federal corporate bodies, the Jordan Valley Authority (JVA) and the Water Authority of Jordan (WAJ). These are described by the MWI (2009) as the two "most important entities dealing with water in Jordan." The WAJ is responsible for public water and sewage systems throughout the country. The JVA's jurisdiction is the Jordan

Valley, and its responsibilities extend beyond water management to socio-economic development; its primary water responsibilities are water development and distribution for irrigation within the Valley (MWI, 2009).

Additional decision-making authorities relevant to water resources in Jordan include the Ministry of the Environment (ME), the Ministry of Agriculture (MA), and the Ministry of Health (MH). Policies originating from these sectors affect water policy and vice versa. In addition, water user associations (WUAs), the private sector, and international development agencies influence and/or make decisions that affect water resources. A non-governmental organization (NGO) within Jordan also plays a role: the Royal Society for the Conservation of Nature (RSCN). The primary role of this NGO is to raise public awareness, mobilize influential actors, and assist with policy implementation (Beaumont, 2005; Haddadin, 2006). As the central government is the focus for this study, primarily the ministries (MWI, ME, MA, MH) and authorities (WAJ, JVA) will be evaluated in the contextual analysis, described below. WUAs and the private sector will also be considered, where relevant. Outside actors without legitimate authority (e.g. NGOs and international development agencies) will not be considered.

There is some evidence that Jordan is attempting to incorporate IWRM concepts into its water plans, though literature on the topic is limited. In terms of equity, Klawitter and Qazzaz (2005) found that 97 percent of Jordan residents are connected to public water delivery systems, and rural residents without piped water often have cisterns; they found this water to be priced at an affordable rate for poor residents. However, a major barrier to affordable access remains in that piped water is not always available. When it is not, trucks transport tanked water to residents in need, and charge up to ten times the rate of piped water (Klawitter and Qazzaz, 2005). Another challenge related to equity is the broader allocation of water among various sectors of the economy. Currently, agriculture in Jordan, like agriculture in most countries in the Middle East, is the largest water user by far. As the country develops, industry and tourism have become increasing priorities (Klawitter and Qazzaz, 2005). Unfortunately for the agrarian communities with a long legacy of farming, tourism and industry are more promising for economic expansion, and thus pressure to reallocate water resources from agriculture exists. According to Scott et al (2003: 212), it will be imperative to “placate the powerful vested interests among water users… and create

alternative livelihoods for people whose jobs may be at risk as a result of changes in water allocation." This remains a concern in Jordan, and for the time being, equity and economic efficiency may remain competing goals.

Jordan may be able to balance this issue by managing more from the demand side, evident in efforts to improve irrigation technology and incorporate treated wastewater into irrigation of certain crops (Haddadin, 2006). Though agricultural water consumption is high relative to other sectors of the economy, Jordan's growing population requires more than simply conserving water. To meet its food needs, Jordan now imports the majority of its grain products; virtual water consumption per capita when estimated in 2002 was nearly 1400 cubic meters (Haddadin, 2006). Where feasible, Jordan also uses wastewater for aquifer recharge (Haddadin, 2006) and greywater and recycled wastewater in agriculture (McIlwaine and Redwood, 2010). Additionally, farmer participation in water management, through water user associations (WUAs), has recently been promoted and adopted in some areas. The JVA launched a WUA project that aimed to achieve "enhance[d] transparency and effectiveness in water use and distribution…increased water use efficiency [and] decreased costs" (Haddadin, 2006: 203), as well as empower farmers to take ownership and responsibility for irrigation systems. In addition to demand-side management that targets the agricultural sector, Jordan has also worked to raise public awareness of water issues, through campaigns. These efforts are intended in part to gain public support for future water tariffs (Haddadin, 2006), as well as increase overall water conservation practices.

Analytical Framework

Our team developed the analytical framework used for this study specifically for the Rewab Project (Table 3.1). It is intended to encompass the broad spectrum of governance elements from a variety of angles. The framework elements were developed using good governance criteria as identified by the World Bank Institute and United Nations, among others, and adapted by our team as we deemed appropriate for the project. Framework elements are divided into functional tasks – or functions – and process features. The framework contains five broad functions, each of which encompasses several more specific sub-functions. The framework also contains five process features. Additionally, the framework contains two major "cross-cutting categories," which describe the various sources

and uses of water. However, for this paper, I have disregarded the cross-cutting categories as a separate analytical component, and instead consider them in the contextual elaboration.

Table 3.1. Analytical framework used to implement the policy and legal document analysis. Documents were assessed by sub-function (e.g. 1.1, 1.2, etc.) and process feature.

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 & demand and dealing with shortfalls
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 and matching the two
4.5	Forecasting and managing floods and flood impacts
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
5.4	Protecting aquatic ecosystems
5.5	Monitoring and enforcing water service standards
PROCESS FEATURES	
1	Transparency
2	Participation
3	Accountability
4	Rule of Law
5	Responsiveness

Data Collection, Compilation, and Analysis Methodology

The goal of this study was to assess the overall coverage of framework elements within policy documents and legal documents, comparing coverage of the two to one another. The unit of analysis is thus the collection of documents (there are two units, one = policy and one = legal). We first collected documents, then coded (also referred to as "tagged") the documents for content associated with the framework elements. Next, we implemented a quantitative assessment, in order to gain a baseline understanding of the level of detail surrounding the tags in the policy and legal documents. Finally, we employed a qualitative assessment, to elaborate on the context in which the tags occur within the policy and legal documents. Additionally, I compared quantitative score results between Jordan and Egypt, and compared results from the institutional document analysis with the complimentary research components for Jordan. The various steps of the research process are displayed in Table 3.2. The former three steps are data collection steps, while the latter four are analyses.

Table 3.2. Outline of research steps, methods, data sources and analysis units, where applicable. The first three steps deal with data collection, and the final four with analysis.

Step	**Research Method**	**Data Source (Unit)**
Documents Collection	Internet search and solicitation of Jordan government for relevant documents	FAO, EMWIS, and Jordan government archives
Documents Sorting	Grouping of documents into two separate categories: policy and legal	Final collection of policy and legal documents
Documents Tagging	Content analysis with codes (tags) assigned based on content	Final collection of policy and legal documents
Numerical Scoring	Team consensus scoring, based on detail of language associated with codes (tags)	Tags within policy and legal documents (2 units = 1 Policy + 1 Legal)
Contextual Elaboration	Team evaluation of context of language associated with codes (tags)	Tags within policy and legal documents (2 units = 1 Policy + 1 Legal)
Cross-country Comparison	Results comparison of numerical scores between Jordan and Egypt	Final quantitative scores for Jordan and Egypt
Cross-component Comparison	Results comparison of institutional document analysis with EBA and OF matrix for Jordan	Results of numerical scoring and EBA ratings for Jordan

Documents Collection

We collected water-relevant documents for Jordan through coordination with an in-country contact with access to national policy and legal documents. Our contact was given a specified amount of time, three months, to retrieve copies of national policies and laws that are: 1) water specific; and 2) intended for another purpose or sector but have a direct impact on water resources. To ensure that the provided collection of documents was complete, our research team then independently searched two U.S. based internet resources that specialize in international and/or environmental laws, provided by the UN Food and Agriculture Organization (UNFAO) and the Euro-Mediterranean Water Information System (EMWIS), as well as the website of Jordan's main water governing authority, the Ministry of Water and Irrigation (MWI). From these sites, we downloaded available documents that our team agreed to be relevant to our study. All collected documents were official English translations where possible; where this was not possible, unofficial translations were used. In total, twenty-five documents were collected.

Documents Sorting

Our team at Oregon State University then sorted the twenty-five documents into two groups: policy and legal (Table 3.3). Documents falling into the policy group include strategies, master plans, or guidelines in which the relevant authorities define goals, and outline intended means of achieving those goals, often within a specified time period (e.g. over the course of a decade). Documents falling into the legal group include laws, by-laws, regulations and government-administered standards or procedural specifications. Eleven of the documents qualified as policy documents, and the remaining fourteen as legal.

Table 3.3. List of Jordanian documents and associated dates, in respective policy and legal groups, in descending chronological order.

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

* Document originates outside of the water sector.

All of the policy documents are specific to the water sector, ranging in date from 1997 to 2008. The National Water Master Plan is the longest and most thorough of these documents, and pertains to all three Jordanian institutions that manage or govern water;

Water Strategy for Jordan is a less complete, informal document addressing many of the same concepts. The National Demand Management Policy outlines how demand management will be incorporated into Jordan's national water strategies. The Water Authority Strategic Plan 2008-2011 focuses on water policy as it pertains to the WAJ exclusively. Additionally, there are three policy documents addressing irrigation, one water utility policy, one wastewater policy, one groundwater policy, and one drinking water policy.

The legal documents range 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 eleven legal documents pertain specifically to either direct uses or sources of water resources. Included among these eleven are standards addressing industrial effluents, irrigation, drinking water, and wastewater; one by-law and one by-law amendment addressing groundwater; and one water infrastructure regulation. Additionally, there is a document for the Ministry of Water and Irrigation (MWI) defining its organization, and one each for the Water Authority of Jordan (WAJ) and the Jordan Valley Authority (JVA) defining their respective legal responsibilities in water resources management.

Documents Tagging

The next step involved transforming the documents into an analyzable form. This step was implemented by me and one additional researcher from OSU. Since the purpose of this analysis was to pull relevant content from a set of documents, we implemented a content analysis methodology. Content analysis is "careful, detailed, systematic examination and interpretation of a particular body of material in an effort to identify patterns, themes, bases, and meanings" (Berg, 2007: 303). There are two distinct steps in any content analysis: data coding and data interpretation (Berg, 2007). In implementing the first step, coding, we looked for both latent and manifest content. While manifest content analysis assesses the surface meaning of texts, latent content analysis assesses underlying meanings (Berg, 2007). Because latent content analysis is naturally more subjective, it requires a validation technique (Berg, 2007). One such technique involves using multiple coders, who must reach consensus over the codes they assign, referred to as *inter-coder reliability* (Lombard, Snyder-Duch, and Campanella-Bracken, 2008). Consequently, two separate coders were involved in the coding process. For the Rewab project we referred to this process as "tagging".

Before commencing the tagging process, each framework element was abbreviated to a simple code, referred to as a "tag" in this study. Tags utilized for this process are displayed in Table 3.4 below. Sub-functions were recorded using their respective decimal number as a tag; for example, sub-function "1.2: Assigning roles and responsibilities" was simply coded as "1.2". Only sub-functions, not the broader whole number functions, were tagged. Process features were tagged using the first letter of the element as a tag, aside from "Rule of Law".

Table 3.4. Codes or "tags" inserted into the documents to reflect content associated with elements of the analytical framework. Sub-functions and process features were tagged.

Framework Element (Tag Term)	**Tag**	**Framework Element (Tag Term)**	**Tag**
Sub-function		***Sub-function***	
(1.1) Structuring sector	1.1	(4.1) Constructing infrastructure	4.1
(1.2) Assigning responsibilities	1.2	(4.2) Distributing water seasonally	4.2
(1.3) Setting policy	1.3	(4.3) Maintaining infrastructure	4.3
(1.4) Integrating nationally	1.4	(4.4) Applying incentives/sanctions	4.4
(1.5) Coordinating regionally	1.5	(4.5) Managing floods	4.5
(1.6) Raising awareness	1.6	(5.1) Issuing service concessions	5.1
(1.7) Securing funding	1.7	(5.2) Enforcing water rights limits	5.2
(1.8) Developing trained professionals	1.8	(5.3) Regulating water quality	5.3
(2.1) Utilizing data	2.1	(5.4) Protecting aquatic ecosystems	5.4
(2.2) Projecting supply/demand	2.2	(5.5) Enforcing service standards	5.5
(2.3) Matching supply/demand	2.3	***Process Feature***	
(2.4) Using decision support systems	2.4	Transparency	T
(3.1) Awarding water rights	3.1	Participation	P
(3.2) Facilitating rights transfers	3.2	Accountability	A
(3.3) Adjudicating disputes	3.3	Rule of Law	L
(3.4) Mitigating transfer impacts	3.4	Responsiveness	R

Each of us read through each document, searching for latent content in the form of words, sentences, paragraphs, etc. that supported any of the framework elements ("tag

terms"); a tag was then was manually inserted into the document, referencing the respective tag term. For example, each place within the material that an organizational role was assigned, we wrote in the code "1.2." Some content was not tagged at all; other content was tagged to reference more than one framework element. After completing the tagging, we compared tags, discussing and reconciling discrepancies. Eventually, we decided upon final tags, which were utilized for the "interpretation" step, or analysis.

Numerical Scoring

Next, we evaluated tags for each framework element for extent of coverage, and assigned two scores – one for policy and one for legal. Related to *inter-coder reliability* discussed above, *inter-rater reliability* ensures that a scoring process is both defensible and repeatable (Lombard et al, 2008). Consensus among research team members as to which final score is assigned is crucial. Each step of the process adds to the rigor of the methodology. The major steps of the numerical scoring are: 1) independent scoring; and 2) deliberation to consensus scoring.

Independent Scoring

A team of three researchers, myself included, independently reviewed each group of provided documents, and assigned a score between 1 and 4, (Tables 3.5 and 3.6). This score represented how extensively overall the group of documents covered the framework element in question. To assign a score, we reviewed tags for a particular framework element in the policy group and legal group, separately, comparing language in the tagged sections of the documents to the specific language in the framework element. As some framework elements include the "and" conjunction, we looked for evidence of *both* sides of the conjunction (e.g. sub-function 3.1 is "awarding and recording water rights *and* corollary responsibilities"; we looked for language that clearly indicated awarding/recording rights but also awarding/recording corollary responsibilities). We then, independently still, using the rubric from Table 3.5 and the language guide from Table 3.6, assigned and recorded an initial numeric score between 1 and 4. Separate scores were assigned to the group of policy documents and the group of legal documents. During the independent scoring process, we

each kept detailed notes as to why we assigned a particular score, pointing to specific documents and language within the documents. We did not confer with one another during this phase, and we each applied precisely the same methodology.

Upon completion of independent scoring, our research team convened to determine the final scores to be assigned for each framework element. During this meeting, the team produced a spreadsheet (see Appendix A for original spreadsheets), which contained the score assigned by each researcher, in order to determine the variation, if any, among the scores. Elements scored identically among us (i.e. unanimous scores) during the initial scoring process were assigned as the final score for that element.

Table 3.5. Rubric utilized to score tagged framework elements. Scores were assigned by whole numbers for sub-functions and process features.

4	The framework element (i.e. sub-function/process feature) is covered extensively in the documentation, and is **specific to the water sector**. Language is rich, detailed, and/or abundant, and clearly refers to the framework element in question. The framework element may present as a section or article heading, or appear consistently across the documentation. There is marginal, if any, doubt that the framework element is a clear priority within the documentation.
3	The framework element is covered to a lesser degree than above in the documentation; language is **specific to the water sector** but less detailed and/or less abundant, but still clearly refers to the framework element in question. Language may be somewhat ambiguous when referring to the framework element, lost among other topics, or included substantially but not as a main point. Alternatively, language is rich, detailed, and/or abundant and clearly refer to the framework element in question, but **refers to the broader environmental (or a related) sector** rather than directly to the water sector. There is some doubt that the framework element is a priority.
2	The framework element is covered marginally in the documentation. Language is present, but unclear, not detailed, or not abundant. If any evidence of the framework element is present, a “2” must be assigned rather than a “1”.
1	The framework element is not covered in the provided material. No evidence of the framework element is present whatsoever, unless it is through a tag that has since been determined irrelevant to the framework element.

Table 3.6. Key terms used to estimate strength of the language used in the documents. The strongest term is listed first, and associated legal obligation goes down descending the table. Information provided by Gabriel Eckstein, Professor of Law, Texas Wesleyan School of Law.

Term	**Example**	**Explanation**
Shall	...shall be established	Strongest - no derogation unless an exception to the obligation is specifically provided
Must	every citizen must…	Creates a rigid sense of obligation, but is also viewed as a pleaded demand
Will	the government will…	Imparts a sense of intent rather than true obligation. Accordingly, it provides the one with the obligation considerable leeway in how to carry out that obligation
Plan	it is the plan to…	Provides an even weaker sense of obligation and greater leeway in how to carry out obligation
Should	companies should comply…	Weakest- creates no legal obligations

Deliberation to Consensus Scoring

Elements with varying scores were assigned a final score by implementing at least two additional steps. First, our research team deliberated over the initial scores, each of us providing justification as to why we assigned our respective scores. After listening to the justification of each researcher, we each then had the opportunity to alter our scores, so that consensus could be reached. If consensus was reached at this point, this became the final score for that element. If consensus was not reached, we revisited the analysis independently and determined if we would subsequently alter our initial scores, then reconvened to deliberate to consensus once again. This process was repeated until consensus was reached among us.

Comparing the ratio of unanimity to consensus provides information on the reliability of the final score (Lombard et al., 2008), and essentially, the repeatability of the entire process. For Jordan, 37.9% of the time, the scoring team agreed unanimously on the final score; the remaining 72.1% of the time, the team was able to reach consensus following deliberation. Unanimity rate was even higher for Egypt scores, at 41.9%. In addition, independent scores that were not unanimous rarely differed by more than one point (see Appendix A for original score spreadsheets). In other words, most of the instances where

unanimity was not reached, two researchers assigned the same score, and the remaining researcher assigned a score either one point higher or one point lower. There was no dominant pattern as to which researcher was the "outlier", which would have suggested that the scoring methodology was either unclear or the researcher not well-trained.

Contextual Elaboration

In content analysis, mixing methods, also referred to as method triangulation, is often advocated, as each approach has inherent weaknesses (Patton, 2002; Esterberg, 2002). Adding a qualitative component to a quantitative study also produces a richer understanding of the phenomenon in question (Esterberg, 2002). Both the initial coding team and the scoring team kept detailed notes, which provided substance for assessing the overall context of each tag. We compiled our notes and assessed them for major themes and/or focus associated with framework elements. The contextual elaboration therefore includes, where relevant, which organization assumes primary responsibility for a particular function, as well as describes from where the supply originates and where the major demands or priorities for that supply are, among other relevant information.

Cross-Country Scoring Comparison

Results of the numerical scoring for Jordan were compared with the results of numerical scoring for Egypt (see Appendix A), to determine if variation between countries is evident. Variation between countries would imply that the methodology is useful for cross-country comparisons, one of the initial goals of the Rewab project. Limited variation may indicate weaknesses in the methodology, for example that the scale used for scoring is too narrow. To compare, scores for each framework element, as well as percentage of consensus versus unanimity, were assessed side by side.

Cross-Component Scoring and Rating Comparison

As previously mentioned, the institutional document analysis was one of three components of the broader Rewab study for each country. The complimentary analyses evaluated the water sector performance effectiveness (expert-based assessment or EBA) and level of decision-making influence of various organizations (organizations and functions

matrix or OF matrix). To better gauge how useful the institutional document analysis is at evaluating the water institution, results from the document scoring were compared to results from one of the complimentary analyses, the EBA (see Appendix B for comprehensive EBA results). Results were not compared to the OF matrix, because its ability to provide information about water governance capacity at this point is unclear. The number of organizations involved in a particular function may be a sign of high capacity for some functions, but not for others. As well, there may be no relationship whatsoever.

The EBA, on the other hand, offers some insight into how complete or accurate of a depiction documents can provide in a water governance capacity assessment. The EBA results are also reflected on a 1-4 scale, so scores for policy documents and legal documents, and ratings for the EBA were compared side by side for functions and process features. Because the scales were based on different criteria, however, conclusions can only be drawn about the general pattern, not specific scores. Additionally, though the broader functions were parallel for the two analyses, the sub-functions differed slightly between the two analyses. In general, the policy and legal document analysis utilized more sub-functions than the EBA. Therefore, select sub-functions were compared between the two as well as broader functions and process features.

Results

Jordan Scores and Contextual Elaboration

Functions

Average scores for policy and legal material varied among the five functions (Figure 4.1). The overall average was a 2.99 for policy material and a 2.39 for legal material. Planning (Function 2) was the strongest in terms of policy coverage, and capacity building (Function 1) was the strongest legally. Allocation (Function 3) was covered the least extensively aggregately, with relatively low scores in both policy and legal material.

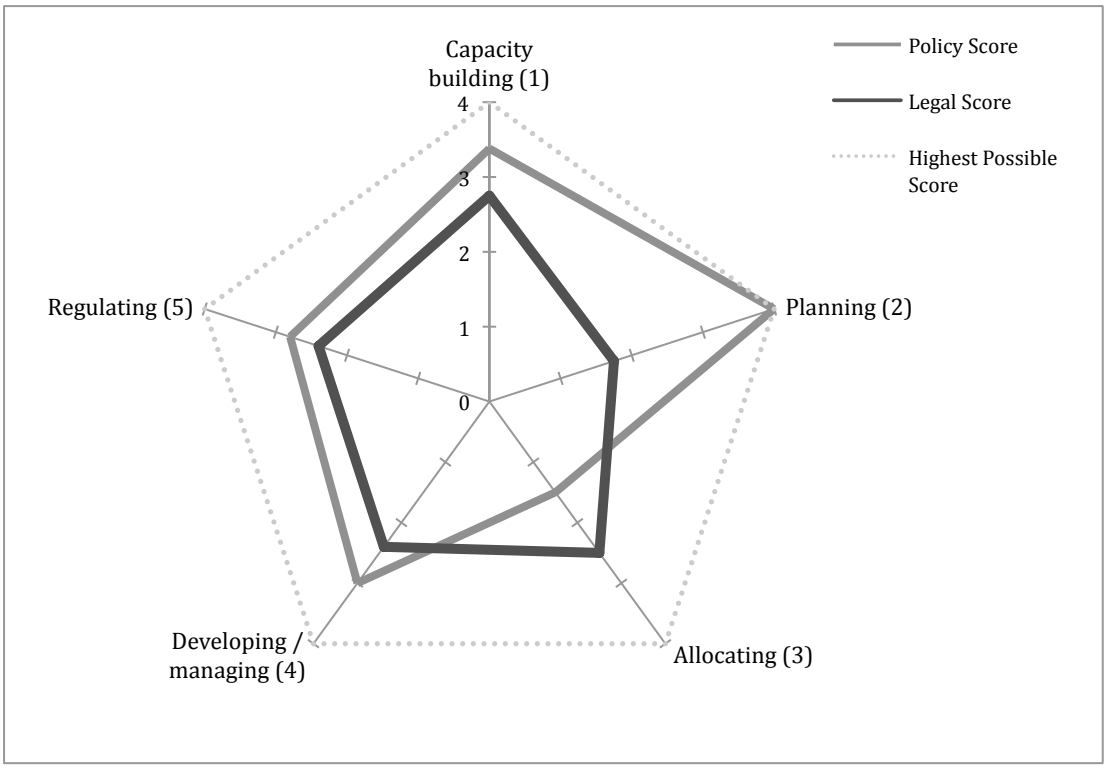

Figure 4.1. Average scores for each of the five functions, with the overall average for all functions together displayed at the top.

(1) Organizing and Building Capacity in the Water Sector

Overall, Jordan's policy and legal documents received a 3.38 and a 2.75, respectively, for Function 1. All sub-functions scored at least a 3 for the policy documents, while the legal documents overall scored lower; all legal documents scored at least a 2. As shown in Figure 3, Sub-function 1.2 had the highest aggregate score, while Sub-functions 1.5 and 1.8 had the lowest.

Figure 3.2. Scores for Function 1, organizing and building capacity in the water sector. Scores are displayed for each sub-function separately, with the average of the eight sub-functions displayed at the top.

(1.1) Creating and Modifying an Organizational Structure

Jordan's policy material scored a 3, and the legal scored a 4 for Sub-function 1.1. While the policy documents emphasize the necessity of restructuring the central government framework to improve efficiency and reduce overlap in the management of water resources, the legal documents streamline responsibilities under the Ministry of Water and Irrigation (MWI) and establish two authorities under the MWI: the Water Authority of Jordan (WAJ) and the Jordan Valley Authority (JVA). According to the National Water Master Plan, the MWI will oversee the JVA and the WAJ, and assume ultimate responsibility for planning, projects and water rights processes; consolidation of fiscal management is suggested as well among policy material. Additionally, there is a heavy focus on restructuring the economy, to increase private sector involvement.

As mentioned, the legal documents officially establish the WAJ and the JVA, and clearly delineate responsibilities among the three organizations now heading the new water sector. The WAJ and the JVA are created as autonomous corporate bodies, with jurisdiction over specific geographic areas, elaborated on in the following section. Ultimate authority remains with the MWI. The Ministry of the Environment (ME) is also established; though it is not a core organization in the new water sector, many of its responsibilities and decisions have direct impacts on the water sector. Outside of the central government, some decentralization of authority to water departments and councils is legally established.

(1.2) Assigning Roles and Responsibilities

Both policy and legal material scored a 4 on Sub-function 1.2. The focus is on coordinating water management among the MWI, JVA and WAJ, along with three key ministries outside the water sector – the ME, the Ministry of Agriculture (MA), and the Ministry of Health (MH). Policy documents adjudicate executive responsibility of operation and maintenance of the water sector to the MWI. In coordination with the MWI, the WAJ is responsible for protecting groundwater resources, the country's main drinking water supply. In addition, the WAJ assumes ultimate responsibility for water utilities, including drinking water and wastewater treatment; transfer of these services to the private sector is encouraged. The major JVA task is to manage irrigation water from source to destination,

though its specific roles will be more clearly defined after reassessment. The JVA will establish water user associations (WUAs), with authority to manage water allocation and distribution. The ME, MA, and MH will each be responsible for water quality protection, for the environment, irrigation, and public health, respectively.

Roles outlined in policy documents are legitimized through the legal framework. Roles for each authority within the water sector are clearly defined, relating to water policy, water management, fiscal management, human resources development, land acquisition, and administrative organization, including allocating responsibilities to sub-national locales. Responsibilities of the MWI, WAJ, and JVA are outlined in Law No. 54, Law No. 18, and Law No. 30, respectively. The MWI is confirmed as the ultimate authority over Jordan's water and sewerage, though the JVA and WAJ take on the majority of management responsibility. Tasks at both the macro and micro level within the WAJ and JVA are outlined, including for the Board of Directors, Secretary General, officials, and employees, among others. The MH shall be responsible for potable water and sewerage, according to the Drinking Water Resources Protection Guidelines, and the ME for environmental water quality, according to Law No. 52. Responsibilities of WUAs are not defined.

(1.3) Setting National Water Policy

Jordan's policy and legal material scored a 4 and a 2, respectively for Sub-function 1.3. The country's dominant policy is state ownership of all water resources. Priority of use is a clear policy focus, specified as: first priority allocated to human use, at 100 liters per person per day, followed by sustaining existing agriculture and expanding industry and tourism. Wastewater and derivative waters are considered part of the national water budget as renewable sources of water. Sustainable use of water resources is consistently represented. Public health is also a primary concern, therefore water quality and sanitation services are carefully considered. Pollution abatement and careful management of hazardous waste are prioritized in the interest of the environment as well as human health. Documents specific to groundwater and wastewater outline national policy for these water sources. Two policy documents outline water for irrigation, and one for municipal and rural water services.

The legal documents focus on state ownership of water resources, and the corollary right of the state to develop, use, and expropriate sources. Water rights are separate from property rights; citizens cannot own water. Water quality protection and pollution prevention are also addressed.

(1.4) Establishing Linkages Among Sub-Sectors, Levels, and National Sub-Regions

Policy and legal documents both scored a 3 for Sub-function 1.4. "Cooperation" and "coordination" commonly appeared as goals within the policy documents, particularly among the MWI, JVA, WAJ and other national entities with a stake in water governance. For example, the MWI, JVA, WAJ and other concerned ministries collaborated on drafting the National Water Master Plan. The plan also addresses the need to develop and strengthen existing sub-sectoral relationships. Cooperation over irrigation, industrial and domestic wastewater management and groundwater development and management is addressed. Additionally, the importance of maintaining close cooperation between WUAs and the state as well as between the private sector and the state is emphasized.

The major emphasis in the legal documents is on horizontal coherency and coordination among the MWI, JVA, and WAJ, as well as vertical coordination within each of the organizations. The most prominent example of vertical coordination is found in Law No. 18, where it is stated that the WAJ shall establish Water Departments throughout Jordan. A Council comprised of both public and private representatives to make decisions over water and wastewater projects is mandated in Law No. 18, as well. Additionally, the ME must coordinate with other concerned parties, particularly where dispute resolution is of issue.

(1.5) Establishing Linkages with Neighboring Riparian Countries

Jordan's documents scored a 3 and a 2 for policy and legal material, respectively, for Sub-function 1.5. Regional cooperation in the policy material focuses on resource exploration and securing and protecting Jordan's shares of transboundary resources. Jordan's strategy is to defend and protect its shares in transboundary water resources through "bilateral and multilateral contracts, negotiations, and agreements" (National Water Master Plan: 14).

Additionally, regional coordination over technology transfer and research and development is promoted, and a regional data bank advocated.

The legal framework puts responsibility for international cooperation in the hands of the MWI and the ME. Law No. 30 states that it does not cancel any previous international agreements.

(1.6) Building Public and Political Awareness of Water Sector Issues

Policy material received a 4, and legal material received a 2 for Sub-function 1.6. The policy documents strongly emphasize public outreach, education, and awareness campaigns about water quality and quantity. Water pricing and other demand management tools are promoted to encourage conservation. Farmer awareness is also a strong focus, and in particular the topic of best management practices to conserve resources. It is stated that farmer awareness programs will be an integral component of future water strategies. Additionally, employees of the industry and tourism sectors will be educated on water use and conservation.

The legal documents that contain public awareness provisions delegate awareness responsibilities to various ministries, mainly the ME. Awareness is referenced and a need for it acknowledged, but it is not mandated.

(1.7) Securing and Allocating Funding for the Sector

Both policy and legal material received a 3 for Sub-function 1.7. The focus is on securing funds, rather than allocating funds to specific projects. Cost-recovery for operations and other water services is referenced as a priority for the water sector in several of the policy documents. In addition, there is a focus on attracting continued donor agency support and loans as well as private investments through build-operate-transfer (BOT) agreements. Capital investment, fees, taxes, and equipment surcharges are also suggested. The WAJ Strategic Plan develops funding and allocation for the sector most comprehensively. It addresses the current lack of budget, stating a goal of increasing the financial ability of the water sector by 2 percent.

Fewer legal documents address securing and allocating funding, but language is more specific. Law No. 52 creates an environmental protection fund, specifying the origin and destination of the funds. Law No. 18 also describes specific targeted sources of funding. Law No. 30 establishes, along with the JVA itself, a treasury for JVA spending, and includes a similar description of funding sources. Other legal documents adjudicate funding responsibilities to entities responsible for passing related by-laws.

(1.8) Developing and Utilizing Well-Trained Water Sector Professionals

Policy documents scored a 3, and legal documents a 2 for Sub-function 1.8. Among policy documentation, professional development is considered a key component to the success of monitoring programs and technological adaptation. The Strategic Plan states that adequate knowledge is connected to the overall success of improving water sector operations. It also puts direct emphasis on employee skill-building, including managerial competency and an ethic and culture that prioritize accountability to citizens. Innovation and maintenance of the irrigation networks are a priority in the irrigation sector. The Irrigation Water Policy emphasizes the development of skilled employees able to educate farmers on advanced water-saving irrigation techniques. The Groundwater Management Policy points out the need for well-trained professionals to monitor and interpret relevant groundwater data. Human resources development is also addressed.

The legal documents that address this element focus on the necessity of high competency in the water sector, namely the MWI. Additionally, the WAJ will train its employees on the topic of water losses.

(2) Planning Strategically

On average, Jordan's policy material scored a 4 and the legal material scored a 1.75 for coverage of Function 2 (Figure 4.3). Coverage of the function overall was extensive and rich among the policy documents, as each sub-function scored a 4. Sub-functions 2.2 and 2.4 were not covered whatsoever in the legal material.

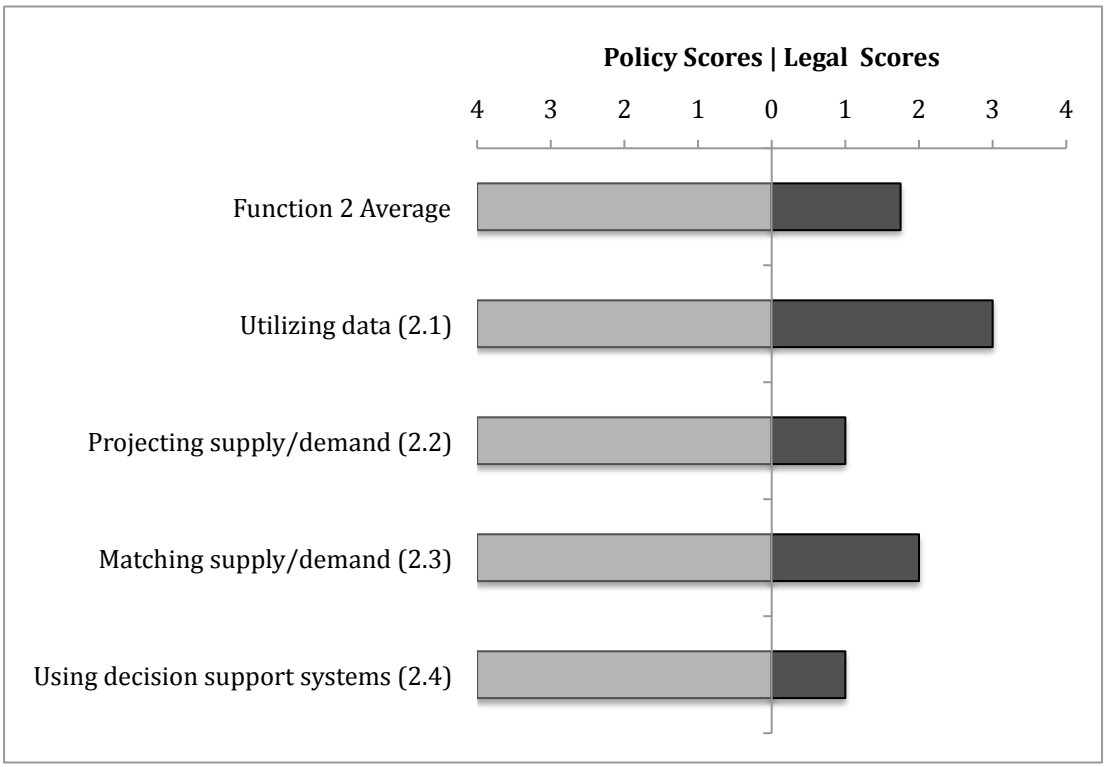

Figure 4.3. Scores for policy and legal documents for function 2, planning strategically. Scores are displayed for each sub-function separately, with the average of the four sub-functions displayed at the top.

(2.1) Collecting, managing, storing and utilizing water-relevant data

Jordan's policy and legal material scored a 4 and a 3 for the policy and legal material, respectively, for Sub-function 2.1. Jordan's National Water Master Plan covers all components of this sub-function – that is, collecting, managing, storing and utilizing – and the remaining policy documents individually bolster that priority is given to these data-related tasks. Data have been collected, and are currently stored in a national data bank created and managed by the MWI. The JVA, WAJ and MWI share responsibility of using this data to make decisions related to water resources use, as well as collecting additional data on a regular basis. Data relevant to surface water, groundwater and wastewater receive attention among the policy documentation. The National Water Master Plan contains a

series of charts and maps, demonstrating how these data are applied to enhancing understanding of current and potential future conditions of water resources in Jordan.

Legal coverage is fairly broad regarding this topic, and the major focus is on the data collection component. Monitoring of drinking water, wastewater, and groundwater are addressed, particularly in terms of water quality. Sustainability of groundwater aquifers is also a concern, however, and thus water meters at private wells are required. All three water sector organizations have responsibilities associated with data collection. Additionally, the national water data bank is mentioned, and applying data toward planning is advocated.

(2.2) Projecting future supply and demand for water

Policy material received a 4 and legal received a 1 for Sub-function 2.2. Once again, the National Water Master Plan alone covers this very extensively, dedicating an entire chapter to current and future (through 2020) projections of water demands per sector; charts, maps and tables are included to exemplify the points. A section on water balance follows, concluding that Jordan, without implementing demand-side management, will not have sufficient supplies to match demand. The Master Plan includes a description of the methodology used to make these projections. The Strategic Plan also devotes a section to the existing gap between supply and demand, including a table that shows predicted figures for the year 2020. Factors that impact water demand, such population growth and a changing economy, are covered among the material.

(2.3) Designing strategies for matching expected long-term water supply & demand and dealing with shortfalls

Scores for the policy and legal material were 4 and 2, respectively, for Sub-function 2.3. This is a clear priority among the policy documents – this category is by far the most varied and it is also the most comprehensively addressed sub-function with regards to strategic planning. The major focus is on supply-dominated strategies, including plans to develop additional groundwater supplies, reservoir construction to utilize base and flood flows, and acquisition of additional transboundary shares. Potential future projects are outlined as well, including importing water from Israel, Turkey and Iraq; cloud seeding; and

desalination of sea water. Demand-side strategies receive less attention, but clear plans are nonetheless discussed from this approach. Demand-side strategies focus on efficiency of use, including reduction of water loss through leakages, and the use of treated wastewater in irrigation. Groundwater sustainability is a clear focus as well – Jordan has plans, evident in the National Water Master Plan among other policy documents, to gradually reduce extraction rates to a sustainable level, so as to ensure their viability for future use. The National Water Demand Management Policy discusses additional demand-management options, such as industrial on-site wastewater recycling and reuse, water-wise landscaping, equipment certification to ensure efficiency, and water-supply augmentation using rainwater, greywater and wastewater. Legal prohibition of water waste is also recommended. The Irrigation Water Policy advocates night irrigation and appropriate crop selection, to reduce loss.

Coverage among the legal material is marginal, and aside from provisions pertaining to pipeline specifications – to reduce losses to leakage – and public education campaigns, the focus is on development and capture of water resources. The WAJ and JVA are both mandated to develop water resources through these documents, and the MWI to prepare long-range plans for satisfying water requirements.

(2.4) Developing planning and management tools to support decision-making

Policy material scored a 4 and legal scored a 1 for Sub-function 2.4. The National Water Master Plan is itself a decision-support system (DSS), and the MWI refers to it as a water information system (WIS), similar to a geographic information system (GIS). It is available in an interactive digital form as well as in hard copy. The MWI, WAJ, and JVA all provide data for the maps and tables included in the Master Plan, which will provide the means for analysis for future water supply and demand of the country. The Master Plan contains examples of maps and models that will result from these analyses – essentially, tools for future planning, including sectoral development. Other policy documents discuss DSSs that will utilize water and related (financial, human resources, etc.) data to project decision-making in regards to development and allocation. Overall, there is a strong emphasis on the importance of

technological tools for future planning, and the use of up-to-date imagery and data-processing software is advocated.

(3) Allocating Water

Function 3, allocating water, received a 1.5 on average for coverage in policy material, and a 2.5 on average in legal material (Figure 4.4). This function scored the lowest aggregately overall of all the functions, as well as the lowest for policy of all the functions. None of the sub-functions scored a 4 for either policy or legal; Sub-functions 3.3 and 3.4 were not covered whatsoever among policy documentation.

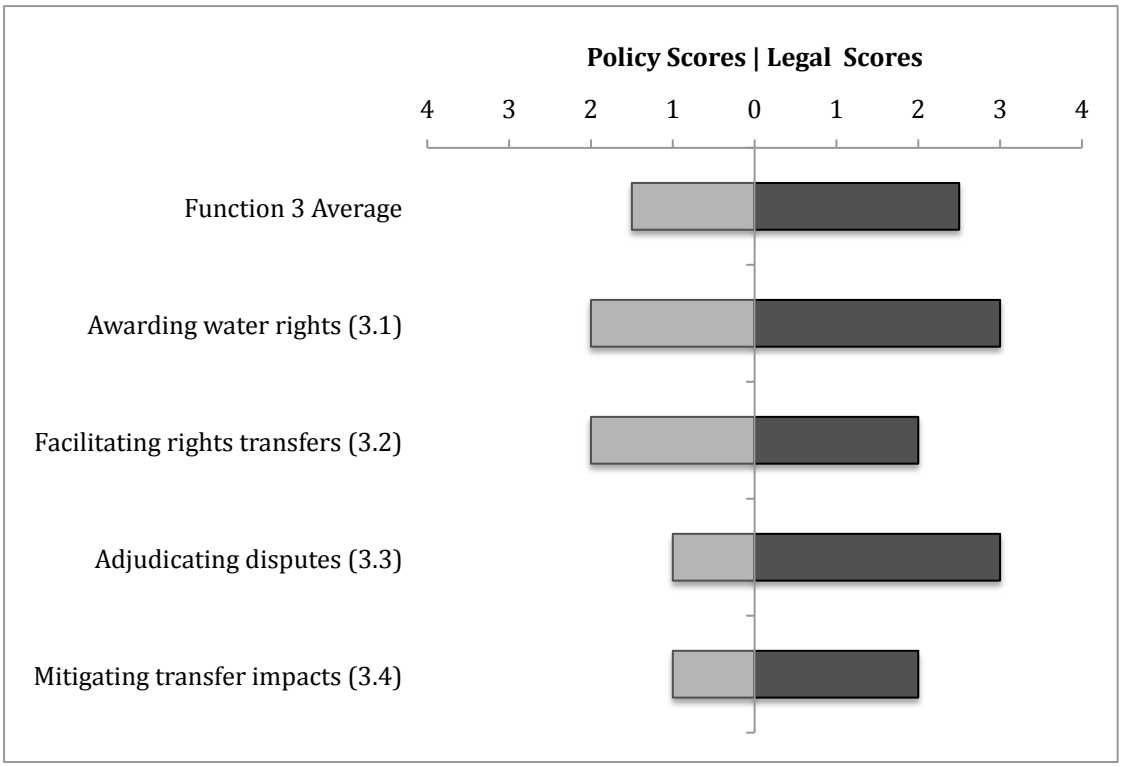

Figure 4.4. Scores for policy and legal coverage of Function 3, allocating water. Scores are displayed for each sub-function separately, with the average of the four sub-functions displayed at the top.

(3.1) Awarding and recording water rights and corollary responsibilities

Jordan's policy material scored a 2, and legal a 3, for Sub-function 3.1. Policy documents rarely address water rights, except to state that water use requires a permit. Focus is instead on sectoral priority of allocation in the order of domestic, municipal, tourism, and industry. Addtionally, changing sectoral allocation, maximizing seasonal resources to increase quantities available for allocation and permitting allocation, and defending Jordan's share of transboundary waters are addressed.

Legal material clearly communicates state ownership of all water resources, and its associated expropriation right. Citizens do not own water connected to their land; rather, they obtain a use-permit. It is prohibited to divert or pump water without a permit. Permitting of groundwater resources is outlined, including provisions that must be included in the permit, such as quantity and intended use, as well as water quality and quantity tests that must be conducted prior to issuance of the permit. Surface water diversions are covered briefly, as well.

(3.2) Establishing water and water rights transfer mechanisms

Policy and legal material each scored a 2 for Sub-function 3.2. One policy document, the National Water Demand Management Policy, contains a provision stating the MWI's intent to institute a viable mechanism for trading water between users in order to encourage reallocation and increase per unit value of water.

Legal material covers the transfer of water rights back to the state, through expropriation. It is also stated that water rights can only be transferred with property ownership transfer, if all owed dues are paid.

(3.3) Adjudicating disputes

Policy documents scored a 1 and legal a 3 for Sub-function 3.3. Legal documents focus on disputes between government and citizens, and facilitation of the appeals process in the event of expropriation. Responsibilities for dispute resolution vary, but are often in the

hands of the JVA (through Law No. 30) or the WAJ (through By-law No. 85), depending on who has jurisdiction over the water source. Courts are used as an additional venue for dispute resolution where established legality is challenged. Law No. 18 establishes the Courts as the avenue for dispute resolution between government entities and landholders.

(3.4) Assessing and managing third party impacts of water and water rights transactions

Policy documents scored a 1 and legal documents scored a 2 for Sub-function 3.4. In legal material, this sub-function is covered solely by By-Law No. 85 and its subsequent Amendment (No. 76). Third-party impacts of water extraction are considered when issuing allowances for well use. Third party impacts also are considered to determine well depth and measures to protect municipal drinking resources.

(4) Developing and managing water resources

Function 4, developing and managing water resources, scored a 3 on average for policy material, and a 2.4 on average for legal material (Figure 4.5). Three of the sub-functions received a 4 among the policy material, but no 4's were awarded to the legal material. Overall, sub-functions 4.1, 4.3, and 4.4 were covered the most extensively.

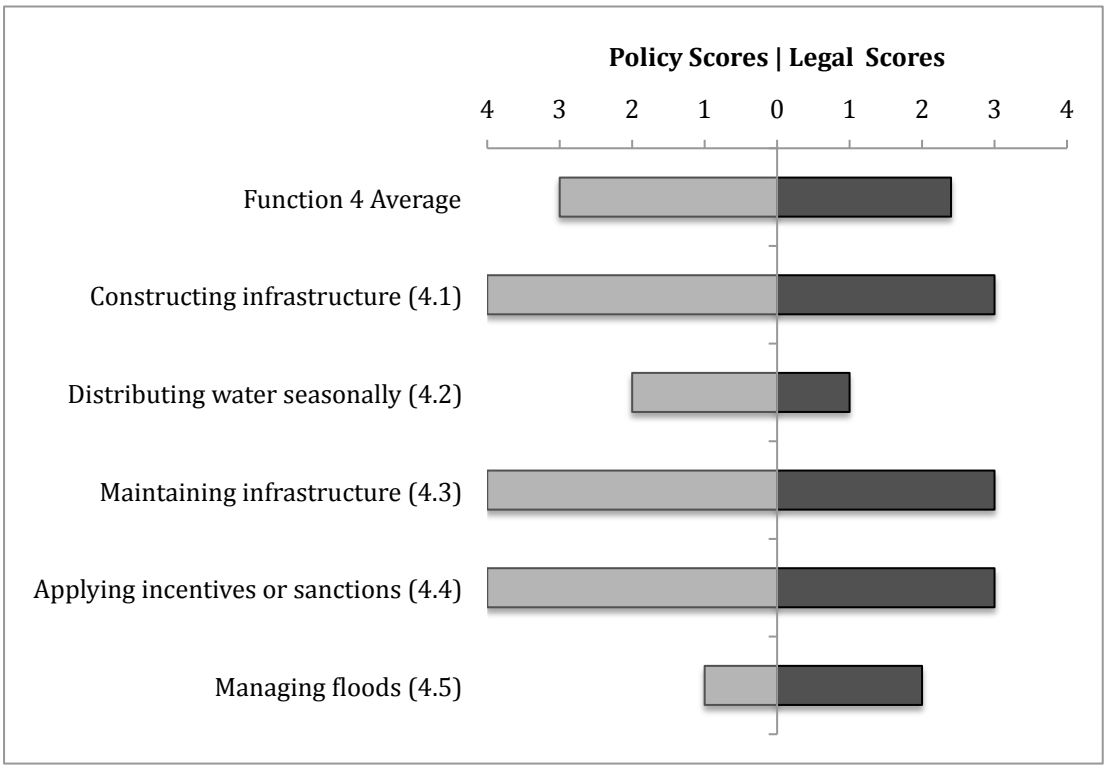

Figure 4.5. Scores for policy and legal material, for Function 4, developing and managing water resources. Scores are displayed for each sub-function separately, with the average of the five sub-functions displayed at the top.

(4.1) Constructing public infrastructure and authorizing private infrastructure development

Policy material scored a 4 and legal material scored a 3 for Sub-function 4.1. Among policy documents, there is a strong focus on increasing water storage capacity, and thus constructing more dams and reservoirs. Many of the policy documents advocate constructing additional wastewater treatment plants and pipelines to transport treated water to agricultural areas for reuse. Construction of desalination plants and several inter-basin conveyance systems are proposed in the National Water Master Plan. Irrigation water conveyance, distribution and drainage systems are also awarded attention, with shared water projects being the favored approach. Throughout the policy documents, the private sector is called upon for the majority of new public infrastructure construction. The policy

documents also discuss infrastructure on private land, with emphasis on improving efficiency of water use and increasing supply through construction of systems such as rainwater harvesting, greywater use, and onsite wastewater treatment.

Legal documents specify JVA and WAJ responsibilities for planning and constructing water projects. For irrigation, hydropower, and water delivery in the Jordan Valley, the JVA maintains this responsibility, and may expropriate land as needed for such projects. The WAJ is responsible for directing and regulating construction of public and private wells; licensure for drilling and maintaining wells requires public notification and technical research. The WAJ also constructs public water and wastewater systems. Directions for laying pipes and connecting water distribution and transport systems are outlined in General Specifications for Water Mains and Distribution Systems and Appurtenances.

(4.2) Forecasting seasonal supply and demand and matching the two

Policy and legal documents scored a 2 and 1, respectively, for Sub-function 4.2. Limited provisions among the policy material acknowledge that it is important to assess seasonal water supplies, particularly in irrigation. During the wet season, farmers are granted free surplus water; during the dry season, night application is encouraged. Planting crops with high water requirements is discouraged.

(4.3) Operating and maintaining public infrastructure according to established plans and strategic priorities

Policy documents received a 4 and legal documents received a 3 for Sub-function 4.3. In line with constructing infrastructure, Jordan's policy material covers a range of approaches to its operation and maintenance. Overcoming technical inefficiencies, improving facilities and networks to decrease losses due to leakages, and reengineering existing infrastructure are all addressed. Provisions apply to irrigation distribution and drainage networks, sewage and wastewater collection and treatment, and dams and reservoirs holding water used for drinking purposes. The MWI, JVA and WAJ are to educate the public on the national policy of efficiency through demonstration of conservation-minded maintenance strategies.

While not as abundant as demonstrated through the policy material, the legal documents contain several relevant provisions, in the form of mandating the JVA and WAJ to operate and maintain projects within their jurisdictional area. As with Sub-function 4.1, irrigation structures, dams, hydropower, wells, pumping, reservoirs, and delivery systems within the Jordan Valley are maintained by the JVA. The WAJ handles water and wastewater systems for the remainder of the country. Additionally, project contractors must provide materials necessary for improvements to their infrastructure as well as have plans approved by the Engineer.

(4.4) Applying incentives and sanctions to achieve long and short-term supply/demand and matching the two

Policy and legal material scored a 4 and a 3, respectively for Sub-function 4.4. Among the policy documents, market-based approaches are commonly used to manage actions that impact water quality and quantity. Water tariffs receive substantial attention, to motivate efficient water use and send clear pricing signals to consumers, as well as attract private investment. Fees and charges are used as explicit means to control groundwater over-pumping. Irrigation water is priced to encourage conservation and discourage planting water-thirsty crops. Overall, pricing is to reflect the social, economic and political value of water. In addition, the government plans to offer recognition for high water efficiency practices.

Legal material places a heavy focus on prohibitions, applying such sanctions as fines and imprisonment for illegal water use and water pollution. Examples of prohibited behaviors include illegal water diversions, exceeding abstraction limits associated with groundwater use permits, and dumping hazardous waste into Jordan's waters. Fines are also established to protect from damages to JVA infrastructure. Pricing to control water use on farms is covered in a single provision, as well.

(4.5) Forecasting and managing floods and flood impacts

Policy material received a 1 and legal material received a 2 for Sub-function 4.5. A single provision was incorporated into the legal material, in the Jordan Valley Development

Law No. 30, stating that the JVA is responsible for planning and designing flood protection works.

(5) Regulating water resources and services

Overall for function five, Jordan's policy documents scored a 2.8 average and legal documents a 2.4 average (Figure 4.6). Sub-function 5.3 was covered the most extensively and Sub-function 5.1 the least. In general, there was not a major difference between policy and legal coverage for any of the sub-functions.

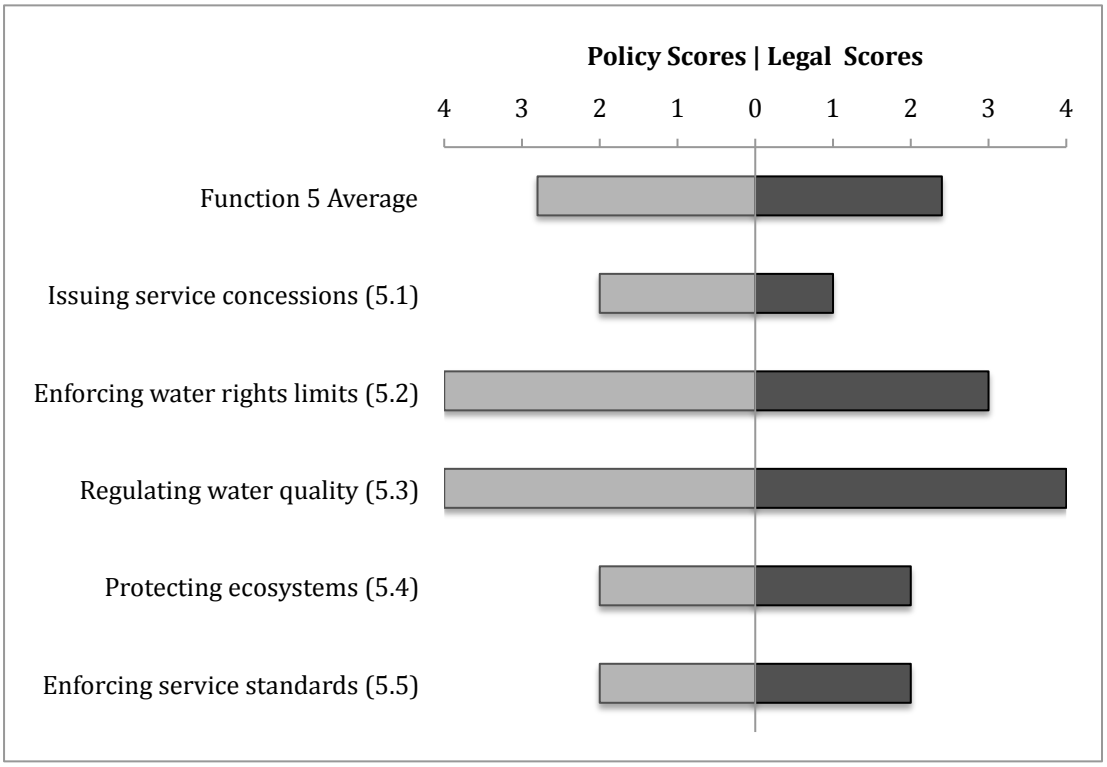

Figure 4.6. Policy and legal scores for function 5, regulating water resources and services. Scores are displayed for each sub-function separately, with the average of the five sub-functions displayed at the top.

(5.1) Issuing and monitoring operating concessions to water service providers

Jordan scored a 2 for its policy documents and a 1 for its legal documents for Sub-function 5.1. Coverage overall is marginal. According to policy documents, concessions and other forms of private sector participation in water utility are to be considered and adopted where appropriate.

(5.2) Enforcing withdrawal limits associated with water rights

Policy material scored a 4 and legal scored a 3 for Sub-function 5.2. The major focus in terms of policy is on protecting groundwater resources and reducing abstraction to sustainable levels. Therefore, widespread use of observation wells and meters to monitor groundwater levels and track withdrawals of individual users are instituted. Careful tracking and measurement of water use is a core focus, along with regulation and enforcement of illegal water use. Water metering and withdrawal monitoring measures are primarily directed at groundwater in the relevant material, while similar enforcement of surface and derivative water allocation is not specifically addressed.

Legal focus is on punishments for non-compliance with water permit/license conditions, which include backfilling of wells, revoking of licenses, fines, imprisonment, and equipment seizure. Additional activities that violate withdrawals, also punishable, include illegal use, illegal diversions, and any water use that benefits an individual at the cost of society. The JVA and WAJ are both called upon for water use regulation responsibilities. Along with state ownership of water, it is indicated that the state also assumes the authority to determine the quantity and conditions of water extraction.

(5.3) Regulating water quality in waterways, water bodies and aquifers

Policy and legal material each scored a 4 for Sub-function 5.3. Protecting the quality of Jordan's water resources is a clear priority. Major emphasis is on protection of public health through regulation of wastewater collection and treatment and appropriate use of treated wastewater. Industrial wastewater will be treated separately from that originating from domestic sources. Care will be taken to ensure that treated wastewater does not come

into contact with surface and ground waters used for drinking purposes. Extensive aquifer monitoring will confirm appropriate practices are implemented. Responsibilities for water quality protection reside with the WAJ, ME, MH and MA.

Legal documents contain several prohibitions and standards related to water quality protection. Punishments, including fines and imprisonment, for polluting surface and ground water are outlined. There is again emphasis on taking necessary precautions when dealing with wastewater. In particular, attention is granted to determining proper facilities and methods of purification, application, and disposal. Drinking water standards, which include parameters for water quality sampling, are well established. The standards specify upper-bound limits for the content of impurities. The WAJ assumes many responsibilities associated with protecting drinking water quality, as well as the MH.

(5.4) Protecting aquatic ecosystems

Both policy and legal material scored a 2 for Sub-function 5.4. Though water quality is a priority, as demonstrated above, the focus is on public health rather than ecosystem health and sustainability. Among policy material, environmental integrity and mitigating environmental impacts are marginally addressed. It is acknowledged that development may adversely affect aquatic systems.

Legal coverage was limited to a single provision. Article 55 of Agricultural Law No. 44 tasks the MA with outlining fishing regulations, including permissible methods and seasons for fishing, as well as species, sizes and quantities to be fished. The regulations themselves are not included, however.

(5.5) Monitoring and enforcing water service standards

Policy and legal documents both scored a 2 for Sub-function 5.5. While the topic of water service standards appears frequently among policy documents, the focus is skewed toward acknowledging those areas that need improving, rather than on how monitoring and enforcing will be implemented. The exception is in the Water Utility Policy, which suggests using observation and testing measures to ensure that water quality standards are met.

Legally, the language centers around monitoring, particularly among the Jordanian Standards. Temporary Public Health Law calls upon water service providers to ensure safe drinking water and adequate sanitation for Jordan's citizens.

Process Features

Averages for the five process features were 3 for policy documents and 1.8 for legal documents (Figure 4.7). Participation and Responsiveness scored the highest among the policy material, and Transparency scored the highest among legal material. Aggregately, Transparency and Responsiveness scored the highest and Rule of Law scored the lowest.

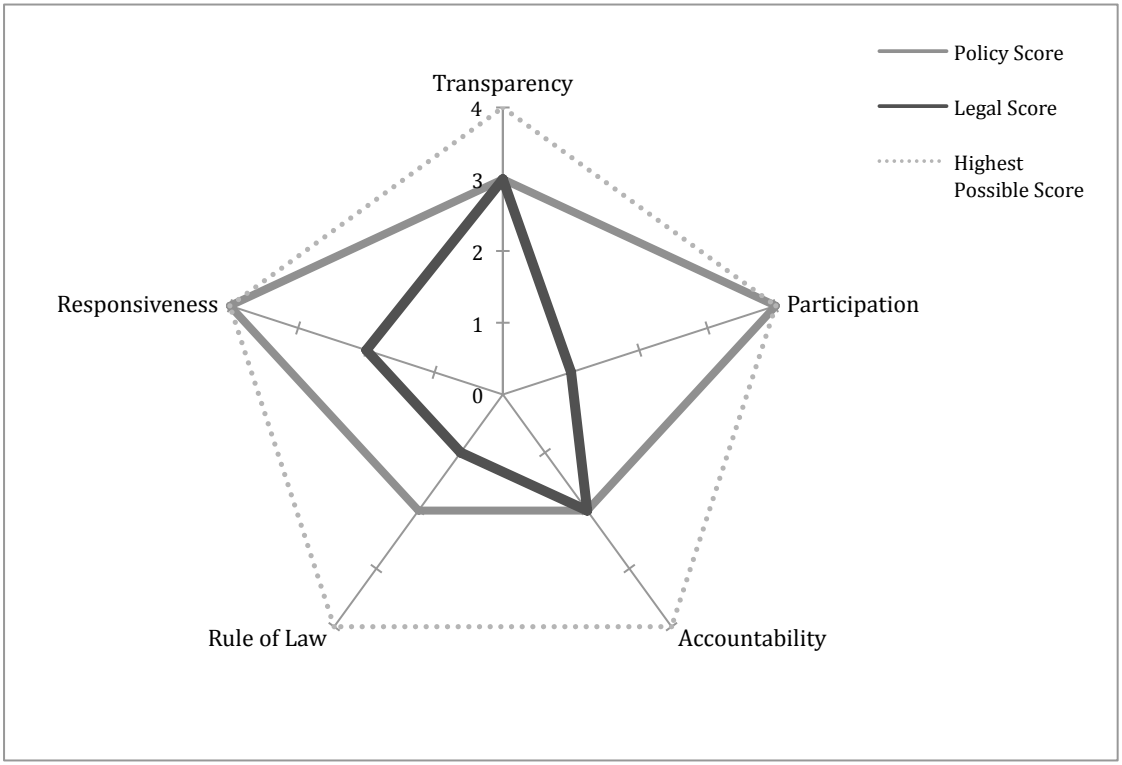

Figure 4.7. Policy and legal scores for the five process features. Scores for each process feature are displayed separately, with the overall average included at the top.

Transparency

Policy material and legal material both scored a 3 for Transparency. The term "transparent" is utilized several times among policy documents, and information dissemination, pertaining to water and water service data, is prioritized. The National Water Master Plan argues that allowing citizens to access water-relevant data will serve both the interests of conservation and public health. A primary argument for decentralizing water management is the benefit of institutional transparency.

Legal documents are all published in the Official Gazette, allowing citizens to remain up to date with legislation in the water sector. In addition, authorities are required to publish reports on water and the environment. The JVA must give notice of expropriation via local newspapers as well as post their intentions in a public location, offering citizens an opportunity to contest action. Applications for drilling licenses, as well as areas where drilling is prohibited, must be published in local newspapers as well.

Participation

Policy documents scored a 4 and legal documents scored a 1 for Participation. Participation at the farm level, in the form of water user associations (WUAs), received substantial attention among policy documents. Enhancing and legitimizing WUA involvement are prioritized, and the JVA is tasked with establishing WUAs throughout the country. Decision-making should be devolved to the lowest level possible; therefore competent WUAs are fundamental to successful decentralized management. Stakeholder and private sector involvement in research and planning are strongly advocated, particularly where increasing efficiency is a stated goal.

Accountability

Policy and legal material each scored a 2 for Accountability. Policy documents infrequently institute anti-corruption measures, though a single provision acknowledges that water services and monitoring should be separated, to avoid conflicts of interest.

Additionally, the necessity of conducting environmental and human health impact assessments early in the planning process is addressed.

Likewise, the legal documents contain mandates for environmental and human health impact assessments, but do not address corruption directly. It is, however, required for corporations to submit regular reports. Additionally, the JVA must disclose specified decisions, providing citizens an opportunity to voice contention.

Rule of Law

Policy documents and legal documents scored a 2 and a 1, respectively, for coverage of Rule of law. A single provision in the WAJ Strategic Plan requires the WAJ to fulfill its mission through equal and just treatment of citizens.

Responsiveness

Policy documents scored a 4 and legal documents scored a 2 for Responsiveness. Law and policy review and modification is advocated among policy material, as part of efforts to respond to changing needs. The recent institutional restructuring compliments these initiatives. The government is attempting to build trust with its citizenry by emphasizing citizen input in decision-making and carefully considering economic, social and environmental conditions prior to implementing projects. The primary theme in these documents is government adaptation to demands and shifting conditions. Monitoring and reporting are common strategies put forth for keeping authorities well informed of progress and needed change.

Coverage within the legal documents is marginal, though there is evidence that laws and by-laws have been updated, repealing and replacing previous legislation. Additionally, drilling and extraction licenses are connected to public interest and social and economic factors. The MWI must also plan according to studies of current water policy.

Cross-Country Comparison of Jordan and Egypt

In comparing scores for Jordan and Egypt, variation was evident. The most variation occurred for the policy scores (Table 4.1). When original or raw scores – that is, those for the sub-functions and process features– are compared, variation by at least one point occurs 51.2% of the time. Comparing policy scores alone reveals variation of 71%, and legal scores alone 32.2%. When the averaged scores for the broader functions are compared, averages varied by more than 0.25 points 40% of the time. Policy averages alone varied 80% of the time, and legal averages did not vary by more than 0.25 points. Functions 2 and 4 varied 100% of the time for policy scores. Function 4 did not vary at all for legal scores.

Final scores for Egypt were reached by 41.9% unanimity and the remaining 57.1% by consensus.

Table 4.1. Comparison of scoring results for Jordan and Egypt. .

		Policy		Legal	
		Jordan	Egypt	Jordan	Egypt
	Function 1 Average	3.38	2.75	2.75	2.87
1.1	Structuring sector	3	3	4	3
1.2	Assigning responsibilities	4	3	4	4
1.3	Setting policy	4	3	2	2
1.4	Integrating nationally	3	3	3	3
1.5	Coordinating regionally	3	2	2	2
1.6	Building awareness	4	3	2	2
1.7	Securing funding	3	2	3	4
	Function 2 Average	4.00	2.75	1.75	1.50
2.1	Utilizing data	4	3	3	2
2.2	Projecting supply/demand	4	2	1	1
2.3	Matching supply/demand	4	3	2	2
2.4	Using decision support systems	4	3	1	1
	Function 3 Average	1.50	1.50	2.50	2.25
3.1	Awarding water rights	2	2	3	3
3.2	Facilitating rights transfers	2	1	2	1
3.3	Adjudicating disputes	1	2	3	3
3.4	Mitigating transfer impacts	1	1	2	2
	Function 4 Average	3	2	2.4	2.4
4.1	Constructing infrastructure	4	2	3	3
4.2	Distributing water seasonally	2	1	1	1
4.3	Maintaining infrastructure	4	2	3	3
4.4	Applying incentives or sanctions	4	3	3	3
4.5	Managing floods	1	2	2	2
	Function 5 Average	2.80	1.60	2.40	2.40
5.1	Issuing service concessions	2	1	1	2
5.2	Enforcing water rights limits	4	1	3	3
5.3	Regulating water quality	4	2	4	3
5.4	Protecting ecosystems	2	2	2	3
5.5	Enforcing service standards	2	2	2	1
	Transparency	3	2	3	3
	Participation	4	4	1	3
	Accountability	2	2	2	2
	Rule of Law	2	1	1	1
	Responsiveness	4	3	2	2

Comparison of Institutional Document and Expert-Based Assessment Analyses

Overall, experts in the water sector, during the expert-based assessment (EBA), rated the water sector on the functions slightly higher than researchers scored functions for the policy documents, and even higher than we scored functions for the legal documents. For the process features, experts overall rated the water sector somewhere between policy and legal document scores assigned by the researchers. Of the five functions, experts rated the sector the highest for Function 3, planning, which also received the highest score for policy coverage of all five functions. Figures 4.8 and 4.9 display comparisons across the five functions and five process features.

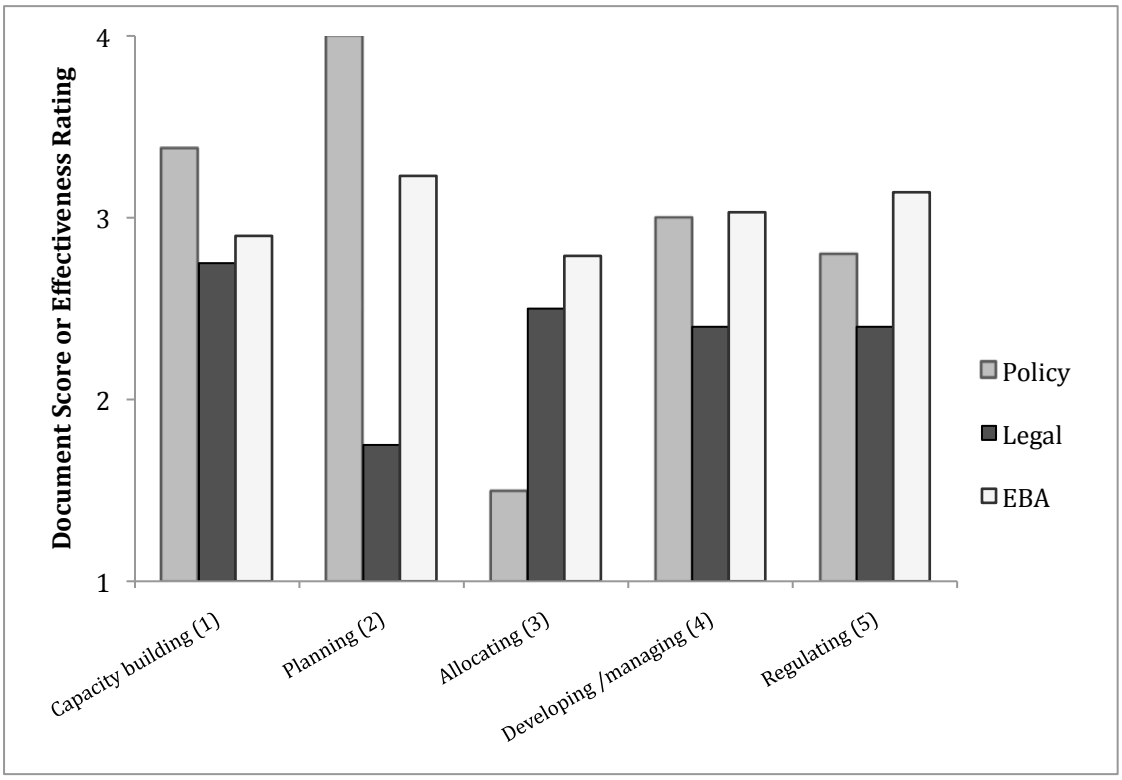

Figure 4.8. Comparison of policy scores, legal scores and EBA ratings for functions.

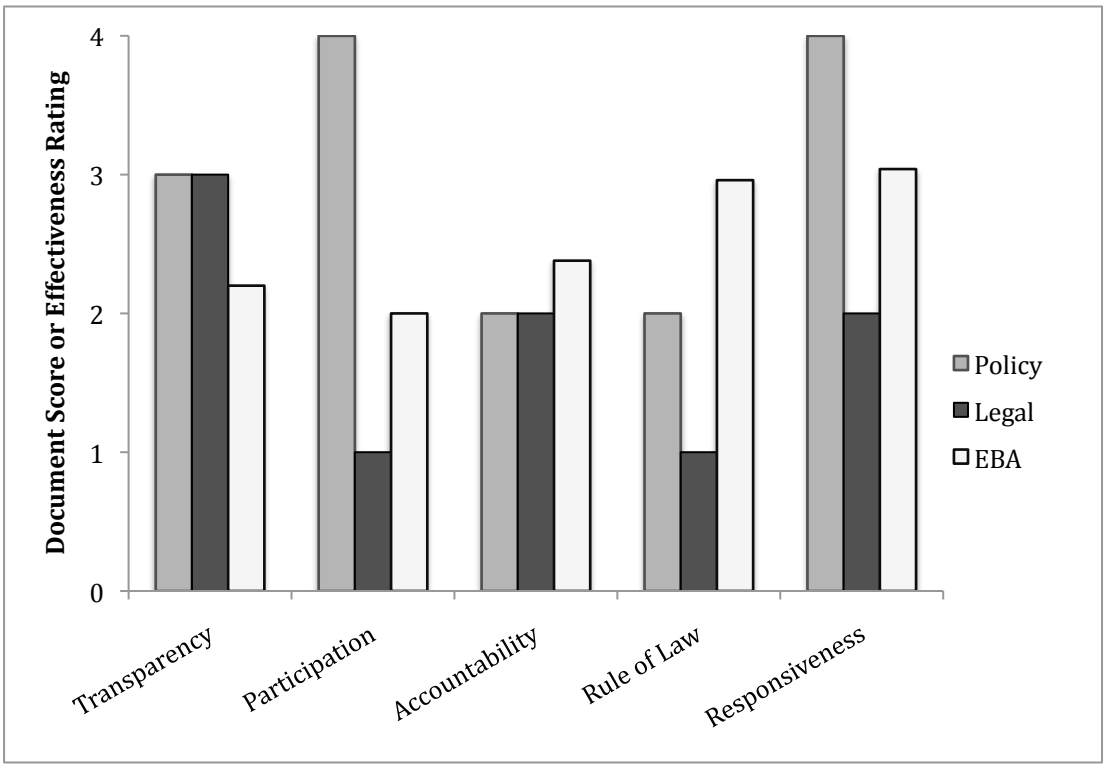

Figure 4.9. Comparison of policy scores, legal scores, and EBA ratings for process features.

Standard deviations for overall function average and overall process feature average were higher for policy and legal scores than EBA ratings. For the functions, EBA ratings were confined to 0.16 variation from the average, while policy and legal scores varied by 0.92 and 0.37, respectively. For process features, variation for the EBA ratings was higher than for functions, but still lower than variation for policy and legal scores. Policy, legal and EBA standard deviations were 1.00, 0.84, and 0.46, respectively.

Slightly different sub-functions were used for the EBA than for the document analysis. For this reason, only select sub-functions can be compared. Sub-functions that coincide between the two analyses are displayed in Table 4.3 below, along with associated scores and ratings.

Table 4.2. Document scores and EBA ratings for coordinating sub-functions.

Criteria	Policy Score	Legal Score	EBA Rating
1.2 Assigning responsibilities	4	4	3.1
1.3 Setting policy	4	2	3.4
1.4 Coordinating nationally	3	3	2.7*
1.5 Integrating regionally	3	2	2.9
1.7 Securing funding	3	3	3.0
1.8 Developing trained professionals	3	2	2.7
2.1 Utilizing data	4	3	3.3
2.2 Projecting supply and demand	4	1	3.4
2.4 Using decision support systems	4	1	3.0
3.1 Awarding water rights	2	3	2.7
3.2 Facilitating rights transfers	2	2	2.8
3.3 Adjudicating disputes	1	3	2.8
4.2 Distributing water seasonally	2	1	3.2
4.3 Operating/maintaining infrastructure	4	3	3.2*
4.4 Applying incentives or sanctions	4	3	2.6
5.2 Enforcing water rights limits	4	3	3.8
5.3 Regulating water quality	4	4	3.0
5.4 Protecting aquatic ecosystems	2	2	2.6

* Two separate ratings related to this sub-function have been averaged to yield this number.

Discussion

Institutional Documents as an Assessment Method

Because laws and policies are an integral component of the water institution (Saleth and Dinar, 2004) and set the foundation for organizational action (Iza and Stein, 2009: 18), their utility for assessing the capacity of the water institution seems intuitive. However, because the major goals of the Rewab project were to identify high and potentially challenging areas of governance capacity within each country and to compare results across countries of the same region, variation must be present. This was the case – both within Jordan and Egypt and between the two – suggesting that the institutional document analysis approach to assessing water governance capacity has some degree of value. However, there is some evidence that this approach may be more useful for some elements of the analysis than others, as well as evidence suggesting certain elements cannot be accurately assessed using institutional documents alone, or possibly even at all.

Variation within score results for Jordan and Egypt suggests that true differences in extent of coverage exist within the institutional documents. That such differences were found bolsters institutional document analysis as a useful and appropriate method for achieving this goal. However, variation between the two countries, though some was present, was less apparent, particularly when comparing legal scores. One explanation for this low variation is that the rubric used to score the documents is not specific enough, and thus differences in coverage do not reflect in scores. However, though scores may not show differences, the contextual elaboration may. This should be explored in a follow-up study that compares both scores and context among various countries in the region.

Another possible reason for similar legal scores is that the integrity of the legal frameworks in terms of capacity is actually similar. This is plausible considering the two countries have similar climatic, social and geographical conditions, as well as similar demand pressures and sectoral priorities. Additionally, laws from the two countries originate primarily from the 1990's, while policies are more recent. Laws and policies from a particular era would logically reflect approaches to water management from that era, as well as address major national and/or regional concerns from that era. Support for this hypothesis

can be found in comparing Jordan and Egypt's legal scores for Function 4, developing and managing water – scores were identical for all five sub-functions. Developing infrastructure, maintaining infrastructure, and applying incentives and sanctions all received 3's for each country, indicating that significant attention was allotted to these topics. This is not surprising, as both Jordan and Egypt experience demands that far outweigh natural supplies; dams, diversions, wells and treatment facilities were crucial to construct and remain crucial to operate and maintain. Additionally, water supplies are not only precious, but are state-owned in both countries; therefore, illegal use of water must be controlled through either incentives or sanctions. This is also corroborated through identical scores for Sub-function 5.2, enforcing water rights limits: both countries scored a 3 here, as well.

Jordan and Egypt also scored similarly for legal coverage of Function 2, planning strategically. Scores for both countries were low, with minimal to no coverage for the latter three sub-functions. Policy documents, by definition, are planning documents that set goals that the legal documents solidify with enforcement mechanisms (Iza and Stein, 2009). That little or no mention of strategic planning was found in legal documents for either country is thus not surprising, especially when compared with policy scores, which were higher – primarily 3's for Egypt and all 4's for Jordan – for both countries. Additionally, decision support systems (DSSs) such as GIS were still in the development and refining stages in the 1990's, and have only in the last decade or so been used to model and project resource use and availability.

A final notable similarity in scores demonstrates that both Jordan and Egypt extensively cover the topic of participation in their policy documents. Participation encompasses many different strategies to increase the number of people involved in decision-making, including expanding private sector management of water resources and subsidiarity of authority. The latter most commonly manifests through water user associations (WUAs), which shift management of irrigation water to the irrigation networks themselves, allowing farmers to collectively make micro-level decisions over the water use and distribution quantities and timing. Participation, namely subsidiarity, is a fundamental pillar of IWRM, promoted for reasons such as increased efficiency and social equity. Jordan and Egypt, like many other countries in the region, experience a diverse range of influences on the policies they adopt as well as the projects they pursue. As participation has been

accepted globally in recent years as a necessary element of good water governance, and endorsed by influential international organizations such as the Global Water Partnership, the World Bank and USAID, one would expect to find significant evidence of participation in modern policy documents. These high scores in policy coverage, though, are challenged by the results from the legal documents, as well as the results from the complimentary analysis, the expert-based assessment (EBA), discussed further below.

If similarities in scores potentially reflect similarities in governance capacity, then differences could be used to identify regional variation in capacity. For example, based on both policy and legal scores, Jordan possesses a higher capacity for regulating water quality than Egypt. Jordan has experienced severe degradation of water resources, including increased salinity of the Jordan River from agricultural return flows (Haddadin, 2006). This may explain the high amount of attention given to this topic. Additionally, Jordanians value the environment highly; when asked during a World Values Survey in 2001, more than half responded they would prefer environmental protection over economic expansion (World Values Survey, 2009).

Another difference reflects the incorporation of demand management, through water rights transfers. While Egypt's documents do not cover this topic whatsoever, Jordan's documents do contain mention of it. An additional difference is in securing funding for the water sector. Jordan's policy documents address this topic more than Egypt's policy documents, but Egypt's legal documents score higher than Jordan's. This suggests that while Jordan understands the importance of secure funding, actual mechanisms to acquire funds may not be present. Egypt, on the other hand, appears to have mechanisms in place.

Evidence of variation, both within Jordan and Egypt and between the two, suggests that institutional document analysis may have utility in assessing water governance capacity. This is further bolstered by examining the timeframe, regional conditions and global influences as potential explanations for the lack of variation in some framework elements. However, a study of the governance capacity of the water institution warrants a study of its organizations, as it is laws, policies and organizations together that comprise the water institution (Saleth and Dinar, 2004). Results from the expert-based assessment (EBA), a complimentary component of the Rewab project, offer an opportunity to explore the completeness of an analysis based solely on documents.

Comparing legal and policy scores with EBA ratings for Jordan reveal a few key patterns. First, for the functional tasks, experts tended to score the water sector in Jordan, on average, right around a 3. It seems highly unlikely that Jordan's water sector is actually relatively equally effective at fulfilling all functional tasks. It is more likely that participants were hesitant to award their water sector a "high" or "low" score, and therefore settled on a score that was above average. In fact, a commonly reported issue with behavior-related questionnaires is that respondents are hesitant to rate themselves on the low end of the spectrum, regardless of actual behavior; thus results often reflect what is referred to as social desirability response bias (Robson, 2002). One major benefit of the document analysis approach is that it is conducted by outsiders who should not feel personally attached to the scores they award, or in other words it is more objective. However, while average policy document scores varied almost entirely across the spectrum, legal scores were also somewhat concentrated around the mean, though less so than the EBA ratings.

A related pattern reveals that most of the time EBA ratings fell somewhere between policy and legal scores. It is possible, then, that Jordan's water sector does in fact function at an effectiveness that is stronger than the laws state, but that hasn't quite reached the level that the policies state. This also corresponds with the fact that Jordan's water policies are more recent than its laws. Without the legislation to back policy, it may prove difficult for organizations to enforce or implement even officially published policies. The ultimate test of this hypothesis is to reevaluate the organizations and legal documents after further legislation has been passed.

In examining the individual sub-functions, the same pattern of EBA ratings higher than legal scores and lower than policy scores is evident the majority of the time. However, a few exceptions are noteworthy. For Function 3, allocating water, two of the sub-functions scored higher on legal than policy, with EBA ratings falling in between the two; so in these cases, the experts rated the water sector lower than the legal documents demonstrate. Furthermore, for three of the overall sub-functions, experts rate the water sector higher than both policy and legal documents score, suggesting that either something is occurring on the ground not captured in the documentation, or that experts' perceptions of effectiveness for these sub-functions is distorted. If the former is the case, it may be that legislation has been updated that was not available for the study, or that informal processes are at work. One of

the said sub-functions is protecting aquatic ecosystems. As mentioned above, Jordanians place high value on the environment, but it is difficult if not impossible to say whether or not expert participants had a similar understanding of what constitutes "protection" as the document analysts did. It is unclear, then, if the documents or the experts yield more accurate results in this case.

Comparing EBA ratings to policy and legal scores of the process features reveals less obvious patterns. Looking at EBA ratings alone shows that experts rated the water sector lower for process features than for functions by about a half point. They rated between a 2 and a 3 for all process features. The relationship among policy scores, legal scores, and EBA ratings is less apparent than with the functions. This may be explained somewhat by the ambiguity of the terms themselves; it is possible that the document scoring team interpreted the terms differently than the expert participants did. In fact, during the workshop, participants actually rated the process features by answering a series of related questions, whereas the scoring team assessed documents and assigned scores based on a single paragraph description of the process feature. Some process features were difficult to identify within documents, based on their inherent nature. For example, responsiveness may be demonstrated by frequent updating of laws and policies, but terminology within documents stating this may not be readily apparent, particularly in legal documents. Additionally, rule of law relates to implementation, which is much easier to assess through interviews or on the ground investigation than documents, due to potential for symbolic policy described above.

Jordan's policy documents speak highly and frequently of participation, which is the reason for its subsequently high policy score. Participation is probably the most tangible concept of all the process features, though, because examples of how it manifests are familiar, and the term itself implies a specific form of action: participating. As discussed above, participation is ubiquitous among the IWRM literature. This term, then, is both comprehensible to scoring analysts and expert participants alike. Interestingly, though policy documents scored a 4 for participation, experts rated rather low – at a 2. Though this rating is more in line with the legal score, it somewhat contradicts literature stating that WUAs are functioning throughout the country (Haddadin, 2006).

Transparency, intended to increase visibility of government actions and reduce corruption, is also a fairly universal concept. However, deciphering it among documents is

somewhat tricky – *how* transparent must actions be to be considered as such? Citizen perceptions of this process feature may offer some insight. In 2009, Jordan scored a 5.0 out of 10 on the Corruption Perception Index (Transparency International, 2010). If results are compared, percentage-wise, to this figure, the documents over-scored transparency. Experts actually scored fairly accurately, even slightly lower than the citizens reported.

Based on this comparison, institutional documents appear to provide either accurate or at least believable results for some of the framework elements, but not others. It is also important to keep in mind that capacity in policy is different from capacity in law. In addition, a few other points must be considered. For one, informal institutions cannot be ignored in any institutional analysis, particularly in a region with a long legacy of religious and social institutions woven into the political fabric. Religion and culture are fundamental and embedded institutions in Jordan that influence policy and may even govern policy to some extent, as they are shared concepts that affect behavior (Ostrom, 2007). The law of Islam states that water is a social good. Evidence of this can be seen through societal dissatisfaction with and resistance to the government instating water markets and water tariffs. According to Haddadin (2006), this is a major reason that such emphasis is placed on public awareness campaigns. Likewise, cultural influences are apparent. The two relevant NGOs speak to Jordan's cultural belief of environmental respect. The RSCN has worked to mobilize influential actors, including the World Bank, to include environmental provisions in a recent major water project (Haddadin, 2006).

Implementation also warrants a discussion here. Many argue that it may be the most important arm of governance to assess, particularly those who discredit IWRM because it is more process oriented than results oriented (Jeffrey and Kabat, 2003). Additionally, policy can be symbolic, meaning that implementation or follow through is lacking (Birkland, 2005). Our study was for the most part intended to assess the foundation for governance, leaving ownership of what happens next up to the countries themselves. Though it is true that policy does not necessarily equate to action, the EBA ratings were intended to assess the implementation component. In the EBA rating sessions, participants were not asked what they valued, believed, or wrote into policy; rather, they were asked how effective their country's water sector is at fulfilling functional tasks or including certain values into the governance decision-making. Implementation was actually reported as a weakness by a

group of experts. At a recent workshop involving participants from all five study countries, the most common self-reported weakness was enforcement and implementation of certain functional responsibilities (see Appendix C for summary of discussion).

Therefore, while a broader study, including an organizational assessment component or a citizen survey, may be necessary to evaluate governance performance of the water institution, institutional documents may be sufficient to evaluate water governance capacity, at least for certain elements of a governance framework. As stated, though, capacity for all framework elements cannot be reported through analysis of institutional documents alone. Without clear, concrete, and universally comprehensible concepts, evaluation of how these areas of governance manifest in documentation may be incomplete, at best. These elements include process features that are difficult to decipher through text, such as responsiveness and rule of law. Drawing conclusions about transparency and accountability should likewise be approached with caution, as these terms are somewhat ambiguous in practice, but were narrowly defined in the framework used to implement the document analysis. Additionally, though the majority of the sub-function framework elements demonstrated a similar pattern to one another, question certainly remains as to the accuracy of either the document analysis or the organizational EBA for those elements where the pattern deviates. Comparing document scores to EBA ratings for additional countries ought to assist in discriminating more definitively between which elements should and should not be evaluated using an institutional document analysis approach. Based on this study alone, it appears that where concepts are clear and easily translated into written verbiage, so long as policies and laws are evaluated independent of one another and deviants awarded due consideration, institutional documents can provide a useful, affordable, and relatively objective approach to assessing how much capacity a country possesses at a given time, for water governance.

Jordan's Capacity for Water Governance

The above analysis places limitations on the conclusions that can be drawn about Jordan's capacity for water governance, by bringing into question either the concepts or analysis results of certain framework elements. For this reason, though overarching patterns are highlighted, conclusions about water governance capacity overall are not offered here.

Instead, areas demonstrating high capacity for water governance and areas where challenges are likely present are discussed autonomously, as well as additional findings of interest.

High Capacity

Jordan's policy documents overall demonstrate higher capacity than the legal documents. In the context of enhancing water governance, this finding suggests that the policies have created a foundation upon which future laws may be built. This is in line with research on the topic, which generally agrees that the role of policy is to set a clear direction for laws and regulations to follow (Iza and Stein, 2009). While this was not evident through every framework element, this was the overall trend. This is alluded to in the National Water Master Plan, through which Jordan states its intent to issue a comprehensive water law, which has yet to come. Corroboration for policy as a precursor to law in Jordan is found in Jordan's approach to groundwater: in 1997, the Groundwater Policy was published, stating the national policy of regulating withdrawals and reducing abstractions to sustainable levels. In 2002 and 2003, Jordan's current groundwater law and its amendments were issued,

Jordan has high capacity for organization in the water sector, demonstrated through both high policy and legal scores as well as the inclusion of all relevant government organizations, encompassing not only those in the water sector, but also those in the closely related sectors of agriculture and the environment. Through its foundation for organization, Jordan embraces the IWRM fundamentals of efficiency and integration, and to some extent, equity and subsidiarity. Jordan's recent reorganization of the water sector and streamlining of responsibilities, as well as its clear definition of which entity of authority is responsible for which tasks, speak to this. Where water-related tasks remain fragmented, Jordan acknowledges it is an issue, and includes plans within its policy documents to make necessary changes. It is well documented among governance literature that excessive overlap and duplication lead to inefficiencies and even competing goals and action (WWAP, 2003). It is also widely accepted that if all responsibilities are concentrated within a single organization, corruption is more likely to occur than when it is more dispersed (WWAP, 2003). By streamlining the water sector, yet separating certain responsibilities, for example enforcing

water quality standards from water quality monitoring, Jordan incorporates this delicate balance of appropriate organization into its policy and legal framework.

Jordan's restructuring resulted in a clear hierarchy in the water sector, with the Ministry of Water and Irrigation (MWI) assuming ultimate responsibility for the country's water, and its two competent authorities, the Jordan Valley Authority (JVA) and the Water Authority of Jordan (WAJ), having corporate decision-making power over water resources within very specific regions of the country. This division of power allows the Jordan Valley, Jordan's primary and productive agricultural region, to develop and use water differently than the cities and surrounding desert areas. As Jordan highly values agriculture, yet also must embrace economic expansion through growing tourism and industry, this separation of management between the two authorities is key to balancing these competing goals. However, coordinated decision-making is still crucial, given the scarcity of renewable freshwater in the country and the religious and cultural belief that water is a social good – water to humans must come above all else. The MWI's constant oversight of JVA and WAJ decisions, in theory, facilitates this coordination.

In addition to the MWI's oversight, capacity for national coordination among various organizations is high. This manifests in irrigation, drinking water and wastewater management. Integrated planning for these priorities involves not only concerned ministries from outside the water sector, but also water user associations (WUAs) and the private sector. The move to decentralize water management to a lower level has necessitated improved coordination. A major concern expressed at the recent workshop in Amman was the shortage of trained and competent personnel to serve as local authorities. Though Jordan does prioritize producing well-trained personnel in its policy documentation, this is a key challenge and potential barrier to successful subsidiarity of water management.

Jordan has high capacity for enforcing withdrawal limits associated with water rights and regulating water quality. In the past, Jordan has experienced serious water quality degradation. Major contributors to pollution have included wastewater treatment plant effluents, cesspools, industrial wastewater, stormwater runoff, and irrigation return flows and percolation (Haddadin, 2006). Over-pumping of aquifers has also contributed to the declining quality of groundwater (Haddadin, 2006), as well as bring into question the sustainability of the resource supply. However, Jordan's policies and laws since the turn of

the century provide evidence that these conditions are – and will be – changing. In addition, Jordan's policy documents place heavy emphasis on raising public awareness of water issues, and as mentioned, national NGO efforts have pushed to have sustainability provisions written into emerging policies and laws.

High capacity is also evident for infrastructure development, operation and maintenance. Public and private infrastructure in Jordan primarily takes the form of conveyance pipelines, wells, rainwater catchment systems, and wastewater treatment facilities. Constructing and caring for this infrastructure enables equitable and reliable water delivery to populations. Though in Jordan, supplies are interrupted in times of limited supplies, nearly the entire population has access to at least an intermittent water supply, with rural access less than 10% lower than urban access (Klawitter and Qazzaz, 2005). Emphasis on infrastructure reflects Jordan's cultural view of water as a social good, where access is an inherent human right. It also reflects the true direness of scarcity in Jordan. Though many of Jordan's solutions to water shortages do focus on attaining more supplies – for example through a Red Sea to Dead Sea conduit or desalination of sea water– the harsh reality is that Jordan's glaring scarcity may not be alleviated by conservation alone. In areas of freshwater abundance, people have the luxury of choosing between supply and demand side management. Jordan, despite all of its public awareness and conservation initiatives, may simply need more water. This will be especially true if tourism and industry are pursued as avenues toward economic expansion.

That said, Jordan's capacity for demand-side management, through incorporating market-based approaches, such as water tariffs, into its management plans is relatively high. However, managing water as an economic good does not jive with the cultural belief that water is a social good, though some experts argue that water pricing will actually benefit the poor (Faruqui et al, 2001). This policy was initially met with adversity, but Jordan is striving to raise public awareness and general acceptance of these new approaches. Though pricing has been instituted, the state recognizes that every citizen has a right to 100 liters of water per day, although it is unclear from the documentation whether or not this is tariff-free.

Lastly, high capacity is also demonstrated in the area of water-relevant data collection and use. Data may be seen as the first step toward improving conditions of water resources. Without records about quality, sectoral use quantities, access, leakages, and other

important indicators, action may be impeded (e.g. it is difficult to set rules without evidence) and corruption can result (World Bank, 2007). Equally crucial is developing an arena for data to be stored and thus accessible for use. According to the National Water Master Plan, the MWI has already established such an arena, and is currently working to compile data from various sources, including the JVA and WAJ data collection networks. The documents contain a heavy focus on water quality, which seems appropriate considering the past degradation that has occurred.

Potential Challenges

Overall, topics related to water allocation may present the greatest challenges, particularly if Jordan decides to institute water markets where water rights can be traded, as this topic was only marginally addressed. However, 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. For the time being, laws do not reflect this demand-side approach, but all of the laws analyzed predate this policy. If Jordan is to adopt this approach, legal mechanisms will likely have to be instated to both facilitate the transfers, as well as to protect third parties from negative associated consequences. As water allocation is considered a core governance responsibility (Jonch-Clausen, 2004), challenges in this area may be key to address.

An additional area that may present challenges relates to water services, and in particular concessions and service standards. Safe and reliable water services, including access to clean water and sanitation services, are central to equitable water management. With the current shift of water and wastewater services to the private sector, measures to ensure reliability of supply, particularly to remote rural areas, may be necessary. Private sector involvement can take the form of build-own-operate (BOO), build-operate-transfer (BOT), as well as other arrangements. Concessions in these arrangements ensure that the private company will achieve certain explicitly specified results, which could include "obligation to supply, equal treatment of users, [and] continuity of supply" (Guislain and Kerf, 1995). The topic thus warrants further attention, particularly in light of accounts in Jordan of interruptions in water supply, which often results in subsets of the population buying water from tanks at up to ten times the price (Klawitter and Qazzaz, 2005).

A related topic is water service for the environment. Though scoring results suggest challenges may be present in this area, the strong environmental ethic in the country, as well as the EBA rating results discussed in the previous section, contradict this finding. The most likely explanations for the discrepancy include 1) informal institutions are fulfilling this role rather than formal governmental organizations, 2) NGOs are fulfilling this role and it has not yet been incorporated into the institutional framework, or 3) the topic was misinterpreted by the document coders, due to ambiguity.

Finally, while it appears that challenges may exist for seasonal water distribution and flood management, these topics are not highly relevant to Jordan's hydrologic conditions. In terms of social, ecological and economic impacts, as of yet, there is minimal need for major flood management in these areas. Likewise, the Jordan River, the country's major surface water source, is primarily controlled upstream on the main channel and on its tributaries, by Syria and Israel. However, as climate change is expected to impact water resources in unforeseen ways, this may be an area that requires attention in the future.

Additional Findings of Interest

In addition to the more "black and white" results that clearly suggest either high capacity or potential challenges, results from a few topic areas seem to either suggest a transition stage of sorts or reflect areas of governance that may be more suitable for policy documents than legal documents. For example, aside from data collection and utilization discussed above, strategic planning topics were for the most part confined to policy documents. Jordan may or may not see the utility in incorporating its planning into laws; often, policy documents do function more as "plans" than laws do. Additionally, public awareness campaigns have been documented as occurring throughout the country, yet legal coverage was lacking. This may have yet to be mandated, or it may be implemented more via the media than the government. In the recent workshop in Amman, participants reported the Jordanian government had recently sent representatives from various media sources to training, to become more knowledgeable on the "facts" of water, so as to report appropriately to the public.

Last, while participation and responsiveness show a similar pattern, as discussed above, responsiveness may be difficult to decipher through documents alone. The topic of

participation, however, is more tangible; thus results may be taken with more certainty. As participation was addressed so frequently in policy, it appears that opportunity exists for legal provisions to follow. Assuming the comprehensive water law referred to in the National Water Master Plan is indeed legislated, a reevaluation of participation afterwards may offer a clearer explanation for this discrepancy. If, however, legal mechanisms continue to lack, this may be an area that warrants attention. Because it appears to be such a high priority, legitimizing participation may offer a greater chance of successful implementation.

Water Governance in MENA

While results from this study offer insight into Jordan's national capacity for water governance, results cannot and should not be inferred to the region. Possibly to greatest utility of this study in regards to the region as a whole is that it assessed the country with likely the greatest need for sound governance capacity, due to severely limited supplies. Considering its situation, results seem favorable, but only further research can draw conclusions on a larger scale. Results from the remainder of the study countries, that is Egypt, Oman, Turkey and Morocco, may later be compared and contrasted to Jordan, and generalizations about overall national governance drawn, but for the time being, conclusions made are about Jordan alone.

In addition, this case study adds to the knowledge base for the region. Jordan shares the majority of its supplies with other countries in the region. Similar assessments of Jordan's riparian neighbors, such as Israel, Iraq, and Syria, will ultimately provide a compilation of information that can be used to evaluate river and groundwater basins for institutional capacity. Integrated river basin management, similar to IWRM but at the basin rather than national scale, is becoming a widely accepted approach (Jonch-Clausen, 2004). National data that facilitates river basin assessments may thus become invaluable as the region prepares for more and more pressing demands on limited, degraded and shared supplies.

Limitations of this Study

While this study has attempted to approach analysis as comprehensively and objectively as possible, a few major limitations exist. One limitation relates to the reliance on

documents as data. For this study, we had to assume that our collection of documents was complete, based on what was provided to us by the countries themselves. However, as with any study, it is possible that pertinent information was not collected. We attempted to minimize the chance of this by searching for documents independently through outside sources. Additionally, this analysis was based on documents collected no later than the fall of 2008, so policies and laws published since then are not included. Since our study, I have found that at least one new relevant document exists: Jordanian Standard 1776 of 2008, which deals with the use of greywater in irrigation. Thus, results from a study such as this must be taken as a snapshot in time. For greater accuracy, new documents should be assessed and added to the analysis from time to time. An additional limitation is the inevitable subjectivity that arises from a latent content analysis. We attempted to minimize the effects of this and remain as objective as possible by using multiple coders and multiple raters.

In addition, there are surely limitations that result from applying a framework based on western values and by utilizing a research team consisting of mostly western researchers. While we compiled elements of the Rewab framework from as many sources as possible and tried to exclude elements with obvious bias, this remains a limitation. Culture and religion in MENA, as mentioned, remain strong forces that no doubt affect what citizens will accept and what can be implemented in a particular country.

Finally, this is a case study of a single country in one region of a geographically and culturally diverse world, and thus inferences about any other country – and even the region at large – must be approached with great caution. Results should instead be viewed as a contribution to the knowledge bases on institutional document analysis and water governance.

Conclusions and Recommendations

Jordan, based on institutional document analysis, demonstrates high capacity for water governance in several areas. Though process features are emphasized as fundamental to good water governance, this study is able to provide very limited information about the process features analyzed. Participation is somewhat of an exception to this, though the analysis for this feature still appears incomplete. Functional responsibilities, though, appear analyzable through this process, which is an important finding in light of the current movement to enhance governance of water resources – establishing benchmarks provides not only a snapshot depiction of governance capacity, but also produces data to which future studies may be compared. This information, combined with technical data on the conditions of water resources and socio-economics, should equip authorities to make well-informed decisions over water resources at a range of scales, including national, sub-national and regional or basin.

To further bolster the institutional document analysis methodology, further research is recommended. As this is currently underway for the remaining three countries participating in the Rewab project, the opportunity to compare results among several countries is imminent. In future application of this framework, ambiguous terms or concepts should be clearly defined, to ensure the most consistent interpretation possible, thus enhancing objectivity, reliability, and repeatability of the analysis in terms of achieving the same results.

Though results of this study cannot be inferred out to the region as a whole, knowledge about governance of one very water scarce country in the region provides valuable information. For one, it raises the question of how complete policies and laws must be when informal institutions are involved, for example in the cultural and religious tradition that water is a social good. As Islam dominates the region in general with this belief ubiquitous across several countries, a certain degree of caution may be warranted in introducing economic approaches. In addition, though IWRM is met with much criticism for its lack of measurability, certain concepts that closely relate to IWRM fundamentals were measurable to a degree in this study. Breaking these concepts down into more specific

criteria may increase the likelihood of obtaining conclusive results in measuring outcomes of IWRM incorporation, which has become widespread in the MENA region.

Bibliography

Aldaya MM, JA Allan and AY Hoekstra. 2010. Strategic importance of green water in international crop trade. Ecological Economics 69: 887-894.

Allam MN and Allam GI (2007). Water resources in Egypt; future challenges and opportunities. Water International 32(2): 205-218.

Allan JA. 2006. Virtual water, part of an invisible synergy that ameliorates water scarcity. In Rogers P, M Llamas, L Martinez-Cortina (Eds.), *Water Crisis: Myth or Reality?* Balkema Publishers, Leiden, Netherlands.

Berg BL. 2007. *Qualitative Research Methods for the Social Sciences*. Pearson Education, Incorporated, Boston.

Beumont P. 2002. Water policies for the Middle East in the 21st century: the new economic realities. Water Resources Development 18 (2): 315-334.

Beaumont, P. 2005. Water institutions in the Middle East. In Chennat Gopalakrishnan, Cecilia Tortajada, Asit K. Biswas (Eds.) *Water Institutions in the Middle East: Policies Performance and Prospect*, (131-152) New York: Springer.

Birkland TA. 2005. *An Introduction to the Policy Process.* ME Sharp, Incorporated: New York, NY.

Biswas AK. 2004. Integrated water resources management: is it working? Water Resources Development 24(1): 5-22.

Braune E and Y Xu. 2008. Groundwater management issues in southern Africa – an IWRM perspective. Water SA 34(6): 699-706.

Brooks DB (2007). Fresh water in the Middle East and North Africa: source of conflict/base for cooperation. In C. Lipchin et al (Eds.), *Integrated Water Resources Management and Security in the Middle East,* (33-64) Dordrecht: Springer.

Cap-Net. 2010. Groundwater Management in IWRM: Training Manual. Retrieved from: http://www.cap-net.org/sites/cap-net.org/files/Cap-Net%20Groundwater%20(web%20res).pdf

Cetin, M. Zafer. (2004). Tales of Past, Present, and Future: Mythmaking and Nationalist Discourse in Turkish Politics. *Journal of Muslim Minority Affairs* 24(2): 347-365.

Champagain AK, AY Hoekstra and HHG Savenije. 2006. Water saving through international trade of agricultural products. Hydrology and Earth System Sciences 10: 455-468.

Colebatch HK. 1998. *Policy.* Open University Press, Minneapolis, MN.

Donkor SM (2006). Water in Africa: management options to enhance survival and growth. United Nations, 2006: Economic Commission for Africa, at: http://www.unwater.org/downloads/nepadwater.pdf [accessed June 28, 2009].

El-Batran M. 2008. Urbanization. In Tolba MK and Saab NW (Eds.) *Arab Environment Future Challenges: 2008 Report of the Arab Forum for Environment and Development* (31-44).

Esterberg KG. 2002. *Qualitative Methods in Social Research*. McGraw-Hill Companies, Incorporated: Boston, MA.

Euro-Mediterranean Water Information System. 2010. http://www.emwis.net/countries

Faruqui NI, Biswas AK, and Bino MJ (Eds.). 2001. *Water Management in Islam*. United Nations University Press: Tokyo, Japan.

Global Water Partnership. 2008. Toolbox: Integrated Water Resources Management. Retrieved from: http://www.gwptoolbox.org/index.php?option=com_content&view=article&id=8&Itemid=3

Guislain P and M Kerf. 1995. Concessions: the way to privatize infrastructure monopolies. Public Policy for the Private Sector. World Bank Note No. 59.

Haddadin MJ (2001). Water scarcity impacts and potential conflicts in the MENA region. Water International 26(4): 460-470.

Haddadin MJ (Ed.). 2006. *Water Resources in Jordan: Evolving Policies for Development, the Environment, and Conflict Resolution*. Resources for the Future, Washington, DC.

International Resource Group (IRG), International Water Management Institute (IWMI), Oregon State University (OSU), Computer Assisted Development Incorporated (CADI), Nile Consultants and ECO Consult. 2009. MENA regional water governance benchmarking project: concept and approach framework, part 1. Rewab Project Reports and Presentations. Retrieved from: http://www.rewab.net/id54.htm.

Iza A and R Stein, (Eds.). 2009. *RULE – Reforming Water Governance*. International Union for the Conservation of Nature and Natural Resources.

Jeffrey P and P Kabat. 2003. Integrated water resources management: A post-natal examination. Contributed paper to the discussion about "Methods for Integrated Water Resources Management and Transboundary Issues" as a part of EC FP6 program topic II.3.1 - Integrated water management at catchment scale.

Jonch-Clausen T. 2004. Integrated water resources management (IWRM) and water efficiciency plans by 2005: why, what, and how? Global Water Partnership TEC Background Paper 10, Sweden.

Khdier K. 2005. Water demand management options in Islamic countries. IHP VI Technical Documents in Hydrology 73: 8-14.

Klawitter S and H Qazzaz. 2005. Water as a human right: the understanding of water in the Arab countries of the Middle East. Water Resources Development 21(2): 253-271.

Lombard Mathew, Snyder-Duch Jennifer, and Campanella-Bracken Cheryl. 2008. Practical Resources for Assessing and Reporting Intercoder Reliability in Content Analysis Research Projects. Retrieved May 2010 from: http://astro.temple.edu/~lombard/reliability/

McIlwaine S and M Redwood (Eds.). 2010. *Greywater Use in the Middle East: Technical, Social, Economic and Policy Issues.* International Development Research Center and the Centre for the Study of the Built Environment, Ottawa, ON, Canada.

Miller G and R Dingwall (Eds.). 1997. *Context and Method in Qualitative Research.* Sage Publications Ltd, Thousand Oaks, CA.

Ministry of Water and Irrigation (MWI). 2009. http://www.mwi.gov.jo/English/MWI/Pages/default.aspx.

Morrissette JJ and DA Borer. 2004. Where oil and water do mix: environmental scarcity and future conflict in the Middle East and North Africa. Parameters: 86-100.

Nimah MN. 2008. Water Resources. In: Tolba MK and NW Saab (Eds.) *Arab Environment Future Challenges: 2008 Report of the Arab Forum for Environment and Development* (63-74).

Ostrom E. 2007. Institutional rational choice: an assessment of the institutional analysis and development framework. In: Sabatier P (Ed.). *Theories of the Policy Process.* Westview Press, Boulder, CO: 2007.

Ozdogan M, Woodcock CE, Salvucci GD, Demir H (2006). Changes in summer irrigated crop area and water use in Southeastern Turkey from 1993-2002: implications for current and future water resources. Water Resources Management 20(3): 467-488.

Patton MQ. 2002. *Qualitative Research and Evaluative Methods.* Sage Publications, Incorporated: Thousand Oaks, CA.

Peters BG. 2005. *Institutional Theory in Political Science: the "New Institutionalism".* B. Guy Peters, New York, NY.

Postel SL. 1993. *The Last Oasis: Facing Water Scarcity*. Worldwatch Institute Environmental Alert Studies, New York: Worldwatch Institute.

Postel SL. 1999. *Pillar of Sand: Can the Irrigation Miracle Last?* New York: W.W. Norton.

Robson CR. 2002. *Real World Research*. Blackwell Publishing: Malden, MA.

Saleth RM and Dinar A. 2004. *The Institutional Economics of Water: A Cross-Country Analysis of Institutions and Performance.* Washington DC: The International Bank for Reconstruction and Development/The World Bank.

Scott CA, H El-Naser, RE Hagen, and A Hijazi. 2003. Facing water scarcity in Jordan: reuse, demand reduction, energy, and transboundary approaches to assure future water supplies. Water International 28(2): 209-216.

Shah, T.; Makin, I. and Sakthivadivel, R. 2001. Limits to leapfrogging: Issues in transposing successful river basin management institutions in the developing world. In: Abernethy, C. (Ed), *Intersectoral Management of River Basins*, pp. 89-114. Colombo, Sri Lanka: International Water Management Institute; Bonn, Germany: Deutsche Stiftung für Internationale Entwicklung.

Tortajada C. 2007. Water Governance in the MENA region: critical issues and the way forward: the case of stakeholder participation and public awareness. Paper presented during the Second Partners´ Forum on "Water Governance in the MENA Region: Critical Issues and the Way Forward", organised by InWEnt Capacity Building International, Germany, and the Arab Water Council in Cairo, June 23-26, 2007.

Transparency International. 2009. Corruption Perceptions Index (CPI). http://www.transparency.org/policy_research/surveys_indices/cpi/2009/cpi_2009_table

United Nations Convention to Combat Desertification (UNCCD). 2008. Human rights and desertification. Desertification, Land Degradation and Drought, Issue Paper No. 1.

United Nations Development Program (UNDP). 1997. Corruption and Good Governance. MDGD Discussion Paper 3. New York.

United Nations Educational, Scientific, and Cultural Organization (UNESCO). 2003. *Water for People, Water for Life: the United Nations World Water Development Report No. 1.* Retrieved May 2010 from http://www.unesco.org/water/wwap/wwdr/wwdr1/.

United Nations Food and Agriculture Organization (UNFAO). http://faolex.fao.org/

United Nations Food and Agriculture Organization (UNFAO). 2009. Aquastat. Information System on Water and Agriculture, at: http://www.fao.org/nr/water/aquastat/main/index.stm

United States Agency for International Development (USAID). 2008. Blue Revolution Initiative. Retrieved from: http://www.bluerevolutioninitiative.net.

Van Vierssen W (2005). Unifying water concepts: water, food, and environmental security. IHP VI Technical Documents in Hydrology 73: 1-7.

Wolf A, S Yoffe and M Giordano. 2003. International waters: identifying basins at risk. Water Policy 5: 29-60.

World Bank. 2007. *Making the Most of Scarcity: Accountability for Better Water Management in the Middle East and North Africa*. International Bank for Reconstruction and Development, Washington D.C.

World Values Survey 1981-2008 Official Aggregate v.20090901, 2009. World Values Survey Association. Aggregate File Producer: ASEP/JDS, Madrid.

World Water Assessment Program (WWAP). 2003. "Governing Water Wisely for Sustainable Development". In: *UN World Water Development Report (1): Water for People, Water for Life*.

Appendices

Appendix A. Original Score Sheets for Jordan and Egypt

Table A.1. Original score sheet for Jordan, used to determine final scores.

Criteria	Score Policy				Legal			
	R1	**R2**	**R3**	**Final**	**R1**	**R2**	**R3**	**Final**
1.1	3	4	3	**3**	4	4	4	**4**
1.2	4	4	3	**4**	4	4	4	**4**
1.3	4	3	4	**4**	2	3	2	**2**
1.4	3	3	3	**3**	2	3	3	**3**
1.5	2	4	3	**3**	2	3	2	**2**
1.6	3	4	4	**4**	2	3	2	**2**
1.7	2	3	3	**3**	3	4	3	**3**
1.8	3	4	3	**3**	2	2	2	**2**
Function 1	3	3.6	3.25	**3.38**	2.63	3.25	2.75	**2.75**
2.1	4	4	4	**4**	3	4	3	**3**
2.2	4	4	4	**4**	1	1	1	**1**
2.3	4	4	4	**4**	2	2	2	**2**
2.4	4	4	4	**4**	1	2	1	**1**
Function 2	4	4	4	**4**	1.75	2.25	1.75	**1.75**
3.1	2	2	3	**2**	3	2	3	**3**
3.2	2	2	2	**2**	2	2	3	**2**
3.3	1	1	1	**1**	2	3	3	**3**
3.4	1	2	1	**1**	1	1	2	**2**
Function 3	1.5	1.75	1.75	**1.5**	2	2	2.75	**2.5**
4.1	3	4	4	**4**	4	2	3	**3**
4.2	2	2	3	**2**	2	1	1	**1**
4.3	4	2	4	**4**	3	2	4	**3**
4.4	4	4	4	**4**	2	2	3	**3**
4.5	1	1	2	**1**	2	2	2	**2**
Function 4	2.8	2.6	3.4	**3**	2.6	1.8	2.6	**2.4**
5.1	2	2	2	**2**	1	2	1	**1**
5.2	4	3	4	**4**	4	3	3	**3**
5.3	4	4	3	**4**	4	4	4	**4**
5.4	2	2	1	**2**	1	2	2	**2**
5.5	2	2	3	**2**	3	1	2	**2**
Function 5	2.8	2.6	2.6	**2.8**	2.6	2.4	2.4	**2.4**
Functions	2.8	2.99	3.04	**2.99**	2.37	2.44	2.49	**2.41**
P1 - T	2	3	3	**3**	3	3	3	**3**
P2 - P	4	4	4	**4**	1	1	1	**1**
P3 - A	2	3	3	**2**	2	3	1	**2**
P4 - L	2	2	2	**2**	1	1	1	**1**
P5 - R	4	4	4	**4**	2	2	2	**2**
Processes	2.8	3.2	3.2	**3**	1.8	2	1.6	**1.8**

Table A.2. Original score sheet for Egypt, used to determine final scores.

Criteria	Score Policy R1	R2	R3	**Final**	Legal R1	R2	R3	**Final**
1.1	2	3	3	**3**	3	3	4	**3**
1.2	3	3	2	**3**	4	3	4	**4**
1.3	3	2	3	**3**	2	2	2	**2**
1.4	4	4	2	**3**	3	4	3	**3**
1.5	2	2	2	**2**	2	2	2	**2**
1.6	4	2	3	**3**	2	2	3	**2**
1.7	2	2	2	**2**	4	4	4	**4**
1.8	3	3	3	**3**	3	3	3	**3**
Function 1	2.875	2.625	2.5	**2.75**	2.875	2.875	3.125	**2.875**
2.1	2	2	4	**3**	2	2	2	**2**
2.2	2	4	2	**2**	1	1	1	**1**
2.3	3	3	2	**3**	2	1	2	**2**
2.4	2	3	4	**3**	1	1	1	**1**
Function 2	2.25	3	3	**2.75**	1.5	1.25	1.5	**1.5**
3.1	2	2	2	**2**	3	3	3	**3**
3.2	1	1	1	**1**	1	1	1	**1**
3.3	2	2	3	**2**	3	2	3	**3**
3.4	1	1	1	**1**	2	2	2	**2**
Function 3	1.5	1.5	1.75	**1.5**	2.25	2	2.25	**2.25**
4.1	2	2	3	**2**	3	3	2	**3**
4.2	1	1	1	**1**	1	1	1	**1**
4.3	2	2	2	**2**	2	4	2	**3**
4.4	3	3	3	**3**	3	4	2	**3**
4.5	2	2	2	**2**	2	2	4	**2**
Function 4	2	2	2.2	**2**	2.2	2.8	2.2	**2.4**
5.1	1	1	1	**1**	2	2	1	**2**
5.2	1	1	1	**1**	3	3	2	**3**
5.3	2	3	2	**2**	4	4	3	**3**
5.4	2	2	2	**2**	2	3	3	**3**
5.5	2	1	2	**2**	1	2	1	**1**
Function 5	1.6	1.6	1.6	**1.6**	2.4	2.8	2	**2.4**
Functions	2.14	2.18	2.23	**2.18**	2.33	2.44	2.33	**2.37**
P1 - T	2	2	2	**2**	2	4	4	**3**
P2 - P	3	4	4	**4**	3	4	4	**3**
P3 - A	2	3	3	**2**	2	4	3	**2**
P4 - L	1	1	1	**1**	1	2	1	**1**
P5 - R	3	4	3	**3**	2	3	2	**2**
Processes	2.2	2.8	2.6	**2.4**	2	3.4	2.8	**2.2**

Appendix B. Results from the Expert-Based Assessment

Table B.1. EBA ratings for applicable sub-Functions.

Statement for evaluation	**Avg. Rating**
Roles and responsibilities of each department or agency are clearly defined	3.1
Policy goals for the water sector are clearly defined	3.4
The water sector is provided with sufficient funds to function properly	3.0
National governmental agencies consult each other when taking decisions that impact multiple sectors	2.6
National governmental agencies cooperate in the implementation of their policies where appropriate	2.7
Regional governmental agencies are consulted when decisions that affect their region are taken	2.9
Governmental agencies are staffed with sufficient and trained personnel to perform the assigned tasks	2.7
Future water supply and demand forecasts are based on good quality data	3.4
Water resources data are collected regularly, continuously throughout the country	3.3
Current strategies for long-term matching of supply and demand have been effective at matching supply and demand	3.0
Rules and procedures for assigning and recording water rights are clearly defined and functioning	2.7
Rules and procedures for transferring water rights are clearly defined and functioning	2.8
Disputes among water users are resolved effectively	2.8
Government agencies are effective at forecasting seasonal supply and demand and matching the two	3.2
Government agencies effectively operate public water infrastructure	3.3
Government agencies effectively maintain public water infrastructure	3.1
Current incentives and sanctions (including water pricing) are effective at achieving long and short term supply/demand matching	2.6
Government agencies are effective at enforcing withdrawal limits that are established	3.8
Official water quality standards in waterways are met	3.0
Aquatic ecosystems are protected to the level specified by the government	2.6

Table B1.2. EBA ratings for Process Features, broken down by key challenges.

	Partic-ipation	**Trans-parency**	**Accoun-tability**	**Rule of Law**	**Respons-iveness**	**Average**
Key Challenge 1: Increasing demand for drinking water	1.74	1.76	2.59	2.74	2.95	2.36
Key Challenge 2: Decreasing groundwater levels	2.08	2.12	2.24	2.93	3.00	2.47
Key Challenge 3: Strategic planning for a national water policy	2.10	2.50	2.18	3.24	3.10	2.62
Key Challenge 4: Regulating water quality in rivers, aquifers and waterways	1.89	2.28	2.51	3.03	3.15	2.57
Key Challenge 5: Matching Supply and Demand in Agriculture	2.18	2.33	2.37	2.89	3.00	2.55
Average	2.00	2.20	2.38	2.96	3.04	

Appendix C. Summary of Governance Discussion

Self-Reported Strengths and Challenges in Water Governance by Country:

Amman Workshop June 28th, 2010

Introduction

At the project wrap-up workshop held in Amman, Jordan in June 2010, experts from the water sector of the five study countries were asked to participate in several exercises related to water governance. One such exercise was a brainstorming session, in which the participants divided into their respective countries, and talked among themselves for an hour in order to identify those areas of water governance they believed to be strengths and challenges. There were four categories they were asked to identify these strengths and challenges from:

1) Law
2) Organization
3) Performance
4) Process

This report contains the results of the brainstorming session for each country. Results are discussed in terms of the four categories, though some of the countries did not present strengths and/or challenges from all four categories.

OMAN

Law

N/A

Organization

Oman reported several strengths in its organization. For one, its water sector roles are clearly defined, and aside from water quality responsibilities, not much overlap is present. Where overlap is present, there are inter-ministry committees to address associated issues and help allocate tasks, recognizing that each ministry has different skills. Additionally, Oman has a Ministry of Legal Affairs, which scrutinizes the process from a central level, ensuring that tasks are implemented appropriately.

A major self-reported challenge is a lack of highly trained personnel in the water sector. Due to lack of competitiveness of salaries in the public sector, there is a high volume of migration of staff from the water ministry to the private sector. Oman expressed that even when the

government pays to train professionals, they often leave after a few years to work for oil and gas companies or other industries. Participants emphasized that Oman must continue to recruit young people, because the government cannot at this point compete with the private sector.

Performance

Oman reported that the government effectively operates public infrastructure for several reasons, making this area a major strength. First of all, sufficient government funding is provided for infrastructure. Second, in comparison to other countries, the amount of infrastructure is limited, making the potential for issues associated with this task lower. In Oman, there is no surface water, so surface water distribution is not a concern. The major public infrastructure consists of desalination plants, recharge dams, and domestic distribution infrastructure. While some irrigation water is managed by the central government, 33% is managed by water user associations, placing the responsibility for operating these networks largely in the hands of the water users themselves.

Oman also reported one challenge in performance, related to the lack of competent personnel in the water sector mentioned above. Because of the "brain drain" phenomenon, engineers are serving as administrative personnel, in which they have had no formal training. This results in lower performance administratively in the water sector.

Process

N/A

MOROCCO

Law

Morocco identified its legal framework as generally strong. The 1995 water law was described as comprehensive and modern, based on the current socio-economic context. Its current policies are also based on knowledge of the physical hydrological system. Additionally, Morocco expressed that it has a bottom-up process that involves strong participation for establishing the law.

Challenges in this area relate to implementation and planning. Morocco presented the example that the government has put meters on the wells, but yet has difficulty with oversight on their use. More difficulty exists for regulating groundwater than surface water, because, while people recognize that dams provide access to surface water, they feel ownership of private wells, and are thus resistant to their regulation. Though Moroccan policy states both "user-pay" and "polluter-pay", this is difficult to enforce in practice.

Organization

A reported strength in Morocco's organization is that its roles are clearly defined. Additionally, there are organizational entities that gather all stakeholders – regional and national – to ensue participation.

The major challenge reported was a lack of competent human resource personnel. It has been difficult for Morocco's water agencies to recruit personnel.

Performance

Morocco reported that updated and reliable data are used for decision-making, as well as well-trained engineers with knowledge on how to design infrastructure and complete other necessary tasks. Additionally, since Morocco's independence from France, there has been a strong focus on developing infrastructure necessary for effective water management.

Because of the lack of human resource personnel, achieving related tasks is a persistent challenge. In addition, Morocco reported that monitoring and enforcement pose challenges. Specifically, the government finds it difficult to limit withdrawals and monitor water quality.

Process

Morocco reported decentralization as a strength, highlighting that many decisions are made at the local level and that participation is becoming the rule rather than the exception.

However, decisions are too often political in nature, because Morocco lacks useful decision-making tools, such as GIS, to back technical-based decisions. An additional challenge is found in the transition to private sector water management. While the private sector is taking over many government tasks, the transition has been slow and not easy to manage. Morocco sees this as a potential risk to collapsing the public sector.

TURKEY

Law

Turkey identified its legal and policy framework as strong, reporting that policies and laws are present and adequate. Turkey reported that its water policy goals are clearly defined.

However, Turkey also reported that no comprehensive water law exists, though several separate water laws exist for drinking water and groundwater, among others. The government believes that water is important – a water forum was held in Turkey last year – but realizes that water will become even more important due to population growth. Therefore, in recognition of this challenge, a comprehensive water law is currently under review.

Organization

A strength Turkey identified in organization was the existence of its State Planning Organization (SPO), which is in charge of ensuring coordination among the various governmental bodies; for example, the SPO receives all projects and decides who should be involved in the decision-making process for each project. In addition, agencies and ministries cooperate with one another and the DSI on water related issues.
One challenge that exists here is an overlap in responsibilities.

Performance

Turkey reported that it has finished constructing all necessary infrastructure. Additionally, its planning is done strategically, meaning that decisions are made based on sound data, taking into account the relationship between supply and demand.

A challenge for Turkey lies in implementation of the law, due to a lack of financial capacity. This specifically manifests in regulating and monitoring water resources.

Process

Of the five process features, Turkey identified Rule of Law and Responsiveness as its areas of strength. No examples were provided.

Turkey reported its major challenge in process to be Transparency. The participants expressed a desire for more NGO involvement in decision-making. This, for example, would ensure that environmental impact statements were prepared when a new dam is proposed. This was reported as a greater challenge with small projects than larger and more visible projects.

EGYPT

Law

Egypt reported that its legal and policy framework is strong, because all ministries participate and accept a new policy or law before it is issued. Because supply and demand are managed separately, all must agree. Additionally, laws specific to water and the environment exist and have been recently revised and/or updated. The National Water Resources Plan includes all relevant information in a single document.

No major challenges were reported in this area.

Organization

In this area, Egypt reported that its organization is well-established and defined. Separate units with specific responsibilities also exist, such as for water quality monitoring. In addition, Egypt has decentralized much of its decision-making responsibilities.

One major challenge related to organization is the lack of implementation. Egypt reported that potential reasons for this are lack of trained personnel and lack of funding. Additionally, corruption may be in issue, in that the one violating the law could be the investor. Another reported challenge is lack of coordination among ministries, due to ministries being responsible for producing their own funds; because there is no shared funding or available budget, each ministry puts its own priorities first, making times of crisis especially challenging. An additional challenge results from decentralization of management. Though responsibilities have been decentralized, there is a general lack of qualified managers at the local or district level. Because other countries can afford to pay more, Egypt loses man of the personnel it trains, and has difficulty attracting qualified managers and employees in general to its own water sector.

Performance

Egypt reported that it is strong in monitoring performance, particularly related to water and air quality. It uses an online monitoring program, which can be downloaded and used from anywhere. In addition, Egypt evaluates its performance to ensure it is up to par.

A challenge in Egypt's performance is an overlap in implementation responsibilities. Egypt also expressed concern with political and media propaganda, stating that they often impede effective performance. In addition, every ministry or government agency in Egypt stores their own data and there is no system for data-sharing on a day to day basis, though data is shared for strategic planning purposes. An additional challenge is a general lack of technology to make decisions.

Process

Egypt identified stakeholder participation in decision-making as a strength. In addition, decisions at the central level are made by a supreme council, which is headed by the Prime Minister. Decisions over water resources involve several steps, which include evaluating the current water strategy, formulating and discussing potential plans, soliciting feedback, and using scenarios of potential outcomes.

A challenge at the district level is that there is a lack of leadership to meet the economic need. Additionally, though performance is evaluated as discussed above, Egypt expressed that this should be done by a third party, instead.

JORDAN

Law

Jordan reported that its laws for the water sector have been in place for a long time and were developed by decision-makers within the water institution, making them both mature and adequate. In addition, current policy and law is supported by the higher court and royal family.

A reported challenge was both overlap of laws in other sectors with water sector laws and gaps in legal coverage. A short-term solution to this is to issue temporary laws, which fill the gaps and help avert conflict. In addition, Jordan reported that priorities are often inconsistent, and change when the government changes.

Organization

Jordan reported that its water organizations have well-defined roles and responsibilities. In addition, there is more and more support coming from outside the water institution in the form of the private sector, donors and NGOs.

Challenges in this area relate to capacity building. Jordan reported the "brain drain" phenomenon as a major challenge. Though opportunity exists to utilize people with expertise currently outside the water sector, Jordan is not making use of these people at this time. An additional challenge is a lack of a higher power in the country to resolve conflicts among sectors or water users.

Performance

Jordan identified its overall performance as strong, due to financial support from donors and private sector investments. There is a great opportunity to make use of the "brain drain" that went to the private sector here, by ensuring that the private sector improves its performance and advances the services it provides. In addition, decisions are made based on accurate data, which, because it is readily available, can be used in a timely manner.

Jordan identified several challenges in this area. First, emergency planning is weak, making crisis management the norm. Second, overlap and gaps described above make good performance difficult. Third, data sharing on the international level is lacking, which could boost performance. Finally, when people leave the sector, knowledge is lost (e.g. there are no institutional knowledge transfer mechanisms).

Process

Jordan did not identify any of the five process features as strengths.

Two were reported as challenges – transparency and participation. The recent restructuring of the water sector received much criticism because it was not accomplished through a very transparent process. Additionally, Jordan reported that not much cooperation of stakeholders or beneficiaries exists.