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MENA REGIONAL WATER GOVERNANCE BENCHMARKING PROJECT

COUNTRY PROFILE – OMAN

October 2010

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TABLE OF CONTENTS

ACRONYMS

EBA	Expert-Based Assessment
GDP	Gross Domestic Product
IRG	International Resources Group
MECA	Ministry of Environment and Climate Affairs
MENA	Middle East North Africa
MoA	Ministry of Agriculture
MOI	Ministry of Industry
MONE	Ministry of National Economy
MRMWR	Ministry of Regional Municipalities and Water Resources
O&F	Organizations and Functions
NGO	Non-Government Organization
PAEW	Public Authority for Electricity and Water
P&L	Policy and Legal
ReWaB	MENA Regional Water Governance Benchmarking Project
US	United States
USAID	United States Agency for International Development
WRC	Water Resources Council
WUA	Water Users Association

FOREWORD

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

The Oman profile was drafted by Lucia De Stefano, Bridget Brown, Rebecka Daye, Alastair Green, Jonathan Lautze, Luke Sanford and Mark Svendsen, with contributions from Slim Zekri and Kirsten Winters. It also drew from a great many other inputs – other project team members, national collaborators, and workshop and rating session participants.

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Regional Water Governance Benchmarking Project

SUMMARY

COUNTRY PROFILE – OMAN

HIGHLIGHTS

OVERALL FINDINGS OF INTEREST

High Capacity

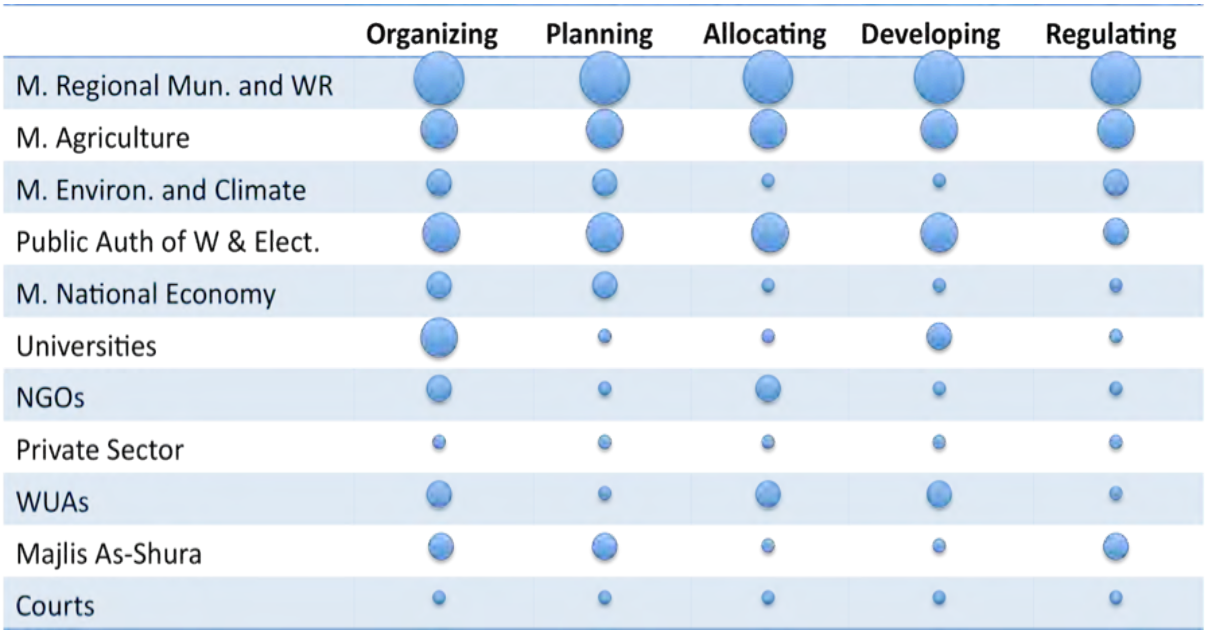
- Assigning roles and responsibilities
- Setting clear policy directions
- Water data collection
- Regulating water quality and protecting aquatic ecosystems
- Clear rules for water rights assignment
- Operating and maintaining public water infrastructure
- Mandating transparency in legal documents
- Rule of law in decision making processes

Potential Challenges

- Funding government agencies and staffing them with qualified personnel
- Consultation with regional authorities
- Legal basis for water allocation
- Forecasting and matching seasonal supply and demand
- Use of incentives and sanctions, such as pricing, to match supply and demand
- Enforcing water withdrawal limits
- Transparency, participation, and accountability in decision making processes

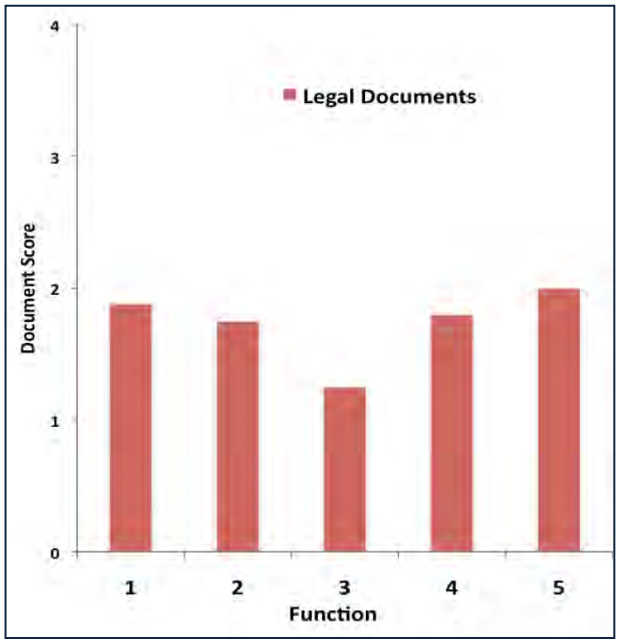
WATER SECTOR ORGANIZATIONS

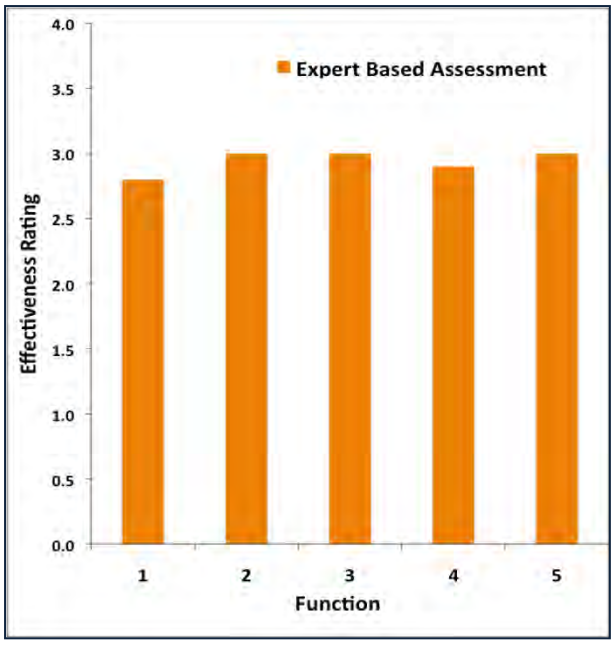
RELATIVE INFLUENCE ON WATER GOVERNANCE FUNCTIONS



STANDARD WATER GOVERNANCE FUNCTIONS

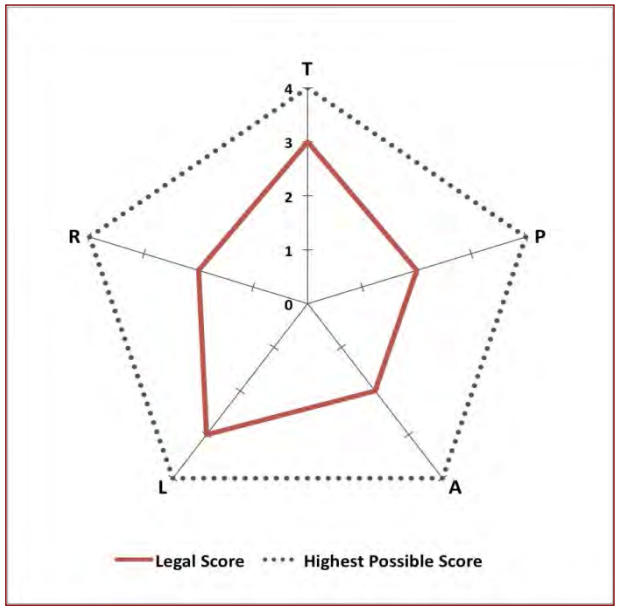
(1) Organizing & Building Capacity - (2) Planning Strategically
(3) Allocating - (4) Developing & Managing - (5) Regulating

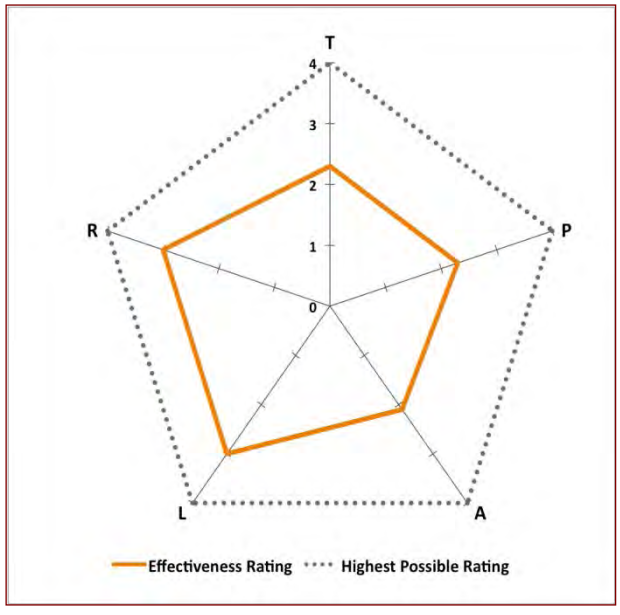




GOOD GOVERNANCE PROCESS FEATURES

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





1 INTRODUCTION

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

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

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

[1] www.rewab.net

2 THE REWAB APPROACH

2.1 CONCEPTS[2]

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

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

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

Table 1. Standard water governance functions and sub-functions

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

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

4.2 Forecasting seasonal supply and demand and matching the two
4.3 Operating and maintaining public infrastructure according to established plans and strategic priorities
4.4 Applying incentives and sanctions to achieve long and short term supply/demand matching (including water pricing)
4.5 Forecasting and managing floods and flood impacts

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

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

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

1. Transparency. Information should flow freely within a society. The various processes and decisions should be open to scrutiny by the public.

2. Participation. All citizens, both men and women, should have a voice, directly or through intermediate organizations representing their interests, throughout water governance policy formulation and decision-making.

3. Accountability and Integrity. Governments, the private sector and civil society organizations should be accountable to the public or the interests they represent.

4. Rule of law. Legal frameworks should be fair and enforced impartially.

5. Responsiveness. Institutions and processes should serve all stakeholders and respond properly to changes in demand and preferences, or other new circumstances.

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

2.2 ANALYTIC TOOLS

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

2.2.1 ORGANIZATIONAL ANALYSIS

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

This analysis employs a matrix-based assessment tool in which panels of water-experts in the country rated the degree of *de facto* involvement of particular organizations in carrying out the water functions in that country[3]. Participants assign scores assessing the degree to which particular organizations influence decisions relating to each of the five standard water governance functions. During the process, participants discuss in groups, and then evaluate individually, the roles of the various organizations. The resulting O&F Matrix is presented and discussed in Section 4.2 of this document and in the Summary at the beginning of the profile.

2.2.2 POLICY AND LEGAL ANALYSIS

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

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

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

In Oman, it was possible to access and assess only the legal documentation. The results of that analysis are presented in Section 5 of this report.

2.2.3 EXPERT-BASED WATER GOVERNANCE RATING

The expert-based assessment evaluates the overall level of effectiveness in performing the five standard water governance functions (functional effectiveness rating) and the extent of application of five characteristics of good governance decision-making (process features rating)[5]. Both ratings are derived from questionnaires completed by national water experts at a Rating Session in the

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

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

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

country. To assess functional effectiveness, participants in the Rating Session are asked to complete the questionnaire using a 4-value rating scale. Respondents discuss the scoring in groups and then complete the questionnaire individually.

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

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

3 WATER RESOURCES CONTEXT

This section gives a brief overview of the political, economic, and social situation in Oman to provide a context for considering Omani water resource governance and management. In addition, it outlines water availability and the main water users in Oman.

3.1 POLITICAL STRUCTURE

Oman is a monarchy, ruled by Sultan Qaboos Bin Said since 1970. The Sultan has worked to modernize his government and has invested heavily in developing Oman's infrastructure and natural resources. Oman has no constitution, and the judiciary is ultimately subject to the decisions of the monarch. Oman has a bicameral legislature, though both houses have only advisory power.

3.2 ECONOMY

Oman is a middle-income country that relies heavily on oil revenues for its GDP. With oil reserves dwindling, the country is trying to diversify into the tourism and gas-based industry. It has a Purchasing Power Parity-adjusted per capita GDP of US$ 25,000, (CIA, 2010) and an unemployment rate of about 15%.

3.3 GEOGRAPHY AND POPULATION

Oman has a population of 2,967,700 (CIA, 2010) and its geography allows habitability in only a small portion of the country. About 55% of the population lives in the Batinah coastal plain, where the nation's capital, Muscat, is located. About 215,000 people inhabit the Dhofar region, and about 30,000 live in remote Musandam Peninsula on the Strait of Hormuz. Oman hosts some 660,000 expatriates, most of whom are guest workers from South Asia, Egypt, Jordan, and the Philippines (CIA, 2010).

Oman enjoys a rich irrigation heritage based on a type of indigenous irrigation system that is still commonly found in the country. The system, called a falaj in Oman, is of a type found across a wide swath of the Middle East and Central Asia that utilizes a sloping tunnel to tap a hillside aquifer and lead the water gradually downslope to the surface. Afalaj[6] comprise the traditional method of supplying water for both irrigation and domestic purposes (Zekri and Marshudi, 2008), and several Omani aflaj are UNESCO-designated heritage sites. Aflaj are typically owned by farming communities and have a well-entrenched system of rules governing water use. While aflaj

[6] Aflaj is the plural of Falaj

are considered old-fashioned by some, they provide independence and self-reliance to their users. Nonetheless, the falaj system is unable to meet the water quality needs of present-day communities in many cases, and as a result many people collect their potable water through a state-provided tap system or through wells (Al-Isaimly and Probert, 1998: 138).

3.4 WATER AVAILABILITY

Oman has only about 1 cubic km of renewable water resources, and as a result its per capita freshwater withdrawal is only 529 cubic meter per capita per year (CIA Factbook, 2010; Al-Obeidani, 2009). Oman has no surface water to speak of, and as a result relies heavily on groundwater and desalination. Of a total of 168 M m^3 of water used each year, 114 M m^3 is derived from groundwater, 55 M m^3 comes from desalination, and 12 Mm^3 from reclaimed wastewater that is collected and reused for municipal landscape irrigation. It is estimated that three-fourths of the supply returns to the hydrological cycle as wastewater or through pipe network leakage (Abdulbaqi et al, 2007).

Agricultural land in Oman covers just 72,600 hectares or 0.23% of the country's area but uses 90% of freshwater withdrawals (Agricultural Census, 2004-5). Farmers rely primarily on sprinkler systems for irrigation (Al-Isaimly and Probert, 1998: 129). Modern irrigation systems were introduced in the 1970s and they currently cover 12,129 ha or 16.7 % of the total agricultural area. Increased groundwater salinity and groundwater depletion are now complicating agriculture in the country (Luebeling, 2005).

Domestic use accounts for around 7% of total withdrawals, and the remaining 2% of withdrawals is used in industry. Three main challenges for Oman's water sector are "prolonged droughts leading to too much water being extracted from the aquifers, seepage of saline water into coastal aquifers, and falaj and well depletion because of excessive abstraction for drinking water and agriculture" (Al-Isaimly and Probert, 1998: 129). Industrial demand, while low, is growing and placing increased stress on already stretched water resources.

In addition to using recharge dams, exploring for additional resources, promoting wastewater collection and reuse, controlling saline intrusion, and monitoring water use, Oman has been working to expand its freshwater resources through desalination for domestic purposes (Hutton, 2003). Since the late 1990s, Oman has adopted a policy of privatization in order to secure outside investment for building and operating expensive desalination plants. Electricity generation has also been privatized, and most new facilities are co-generation facilities producing both electricity and desalinated water. According to a 1993 General Census Survey by the Ministry of Development, 36% of the population receives its domestic water from an assured chlorinated supply through a piped distribution system, and another 57% receive tanker supplies or public and private well supplies (Abdulbaqi et al, 2007). Afalaj have special importance because they provide access to groundwater in the mountainous areas of the country where water is otherwise very scarce.

Oman has a wastewater treatment capacity of over 100,000 cubic meters per day, and is currently constructing more wastewater treatment plants, with an estimated 230,000 cubic meter per day of new capacity to be built by 2015. (MEED, 2009) Over half of Oman's wastewater infrastructure is in Muscat, but plans to develop treatment facilities in other parts of the country are advancing.

4 ORGANIZATIONAL ANALYSIS

This section describes the prominent organizations involved in water management in Oman and their roles in the water sector. Then it assesses the level of *de facto* influence of these organizations in decision-making related to the five standard water governance functions, using an Organizations and Functions (O&F) Matrix.

4.1 MAIN ORGANIZATIONS IN THE WATER SECTOR

Oman's current water policy has been affected by a number of variables, including its situation as an oil-producing country, a shift of population from rural to urban, investment by trans-national corporations, new technologies in water processing and distribution, and Oman's political culture, which has been guided by a Sultan whose reign has been one of progress toward development and building infrastructure. A steady transition in water policy has occurred in the last 40 years. Planning for the future, the Omani government began implementing an extensive 20-year water management plan in 2000. The private sector plays a role in that plan. Private companies are contracted to build (and sometimes own and operate) desalination plants and water infrastructure. The government policy is oriented towards privatization of the water supply, much of which is derived from desalinated seawater.

Ministry of Regional Municipalities and Water Resources (MRMWR). The MRMWR plays a central coordinating role among the organizations involved in Oman's water sector It describes its tasks as: "the management and assessment of water resources, through the maintenance of the aflaj, excavation of the auxiliary wells, building the dams, monitoring the water status, and implementing the projects for the utilization of non-traditional water resources, as well as enhancing awareness on the importance of protecting water resources from depletion and deterioration (MRMWR, 2010).

Ministry of Agriculture (MoA) Before a re-allocation of responsibility for aflaj and irrigation systems to the MRMWR, the Ministry of Agriculture was responsible for managing these facilities. Now, though its influence in the water sector has decreased, the MoA still works closely with the MRMWR in optimizing the use of water resources. The MoA plays a major role in helping farmers adopt modern irrigation technologies and determine the crops they should plant, and also plays a large part in researching new crop varieties and cultivation methods to make most efficient use of water resources. It also provides services such as pesticide spraying and plowing for farmers.

Ministry of Environment and Climate Affairs (MECA). Created in 2008, the MECA took control of most of the MRMWR's environmental programs. Because of its relatively new status, it still works very closely with the MRMWR, but is officially responsible for water quality, water pollution, and wastewater treatment. However, the MECA's water quality work is shared with

the MRMWR which is responsible for water policy formulation. This ministry is also responsible for regulating water quality across Oman's waterways.

Public Authority for Electricity and Water (PAEW). While the MRMWR is responsible for water resources as a whole, the PAEW manages municipal water supplies. Its primary roles include: (1) providing drinking water according to Omani standards and in response to urban expansion; (2) activating and strengthening government policy to develop the water sector; and (3) encourage the private sector to invest in the water sector. The PAEW controls desalination plants, water purification facilities, and wastewater treatment plants. PAEW executes government policy, after approval of the Council of Ministers, on water sector privatization in collaboration with the Ministry of Finance and the Ministry of National Economy. PAEW is an independent institution whose plans and strategies require approval by the Council of Ministers and the Minister of National Economy.

Ministry of National Economy (MONE). MONE's primary role is to "propose the development strategy and future trends for the national economy" (MONE, 2010). MONE collaborates with the PAEW and the MRMWR to develop water resources in a way that facilitates economic growth. Funding for infrastructure projects often goes through MONE, and MONE is responsible for approving government subsidies and loans for agriculture.

Universities. Universities collaborate with ministries and receive government grants to study current conditions and future water scenarios in Oman. The leading university in the country is Sultan Qaboos University. It has its own water research center, which is governed by a committee of faculty members and professionals from government ministries. The Sultanate Research Council and semi-public companie,s such as Petroleum Development Company, provide substantial funding for research.

Water Users Associations (WUAs). WUAs are closely linked to the falaj system. Aflaj provide a distribution system for water with rules that, in many cases, have been operating for hundreds of years. Aflaj are run by a wakil, or director, who is chosen by the owners of the falaj. This person is in charge of "water distribution, water rent, expenditure of falaj budget, solving water disputes between farmers, emergencies, and other activities" (Zekri et al. 2006). Over 3,000 aflaj are still managed by WUAs without governmental intervention. The Ministry of the Interior approved a new form of farmers association in 2009, which could signify a shift in governmental policy towards broader support of WUAs.

Majlis As-Shura. Majlis As-Shura is an elected consultative council that advises the Sultan. It was established in 1990, replacing a previous body. The Majlis, in turn, has a number of special committees, among them a water committee. The Majlis discusses and, if necessary, amends and votes on any bill of law in the economic and social sectors that the Council of Ministers passes to it. Once the law is returned, the Council of Ministers chooses whether or not to take into account the recommendations introduced. The ministers have to appear before the Majlis twice a year to answer the members' questions.

Courts. Courts would appear to be only peripheral to the water sector in Oman. There is no water court system, and most water disputes are related to the falaj system and are resolved locally. Some cases related to water are, nonetheless, settled in courts.

Private Sector. Consulting firms are very active in Oman. They prepare most of the strategic plans and project feasibility studies. Local consulting firms are prominent in this area, but they usually team up with international consulting firms to bid for studies advertised by the different ministries.

4.2 ORGANIZATION AND FUNCTION MATRIX

This section presents the results of a Workshop held in Oman in December 2009 and attended by 24 water experts active in the Omani water sector and representing a range of backgrounds and institutional affiliations (Annex 1). Participants in the workshop evaluated the roles of different organizations by assigning a score assessing the degree to which an organization influences decision-making in each of the five standard functions. Five groups of 4 to 5 participants each completed this exercise.

Their scores were then averaged to yield the value shown in Table 3. Listed vertically are the assessed organizations. Listed horizontally are the five standard water governance functions.

Each cell in the interior of the table provides a score that reflects the degree to which a particular organization influences decisions about a particular function. The scale ranged from 1 to 5, where 5 indicated the highest level of influence. To give a quick visual picture of the relative magnitude of the scores, individual cells have been shaded such that darker cells indicate stronger influence and lighter cells indicate less influence.

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

	Organizing	Planning	Allocating	Developing	Regulating	**Average**
Min Regional Municipalities and Water Resources	4.0	4.4	3.8	4.4	4.4	4.2
Min of Agriculture	3.8	3.4	2.8	3.2	3.2	3.3
Min of Env and Climate Affairs	2.6	2.2	1.3	1.8	2.8	2.1
Public Authority for Electricity and Water	3.8	3.8	3.8	3.6	2.4	3.5
Min National Economy	2.3	2.6	1.3	1.8	1.4	1.9
Universities	3.3	1.8	1.0	2.3	1.0	1.9
NGOs	2.0	1.5	2.3	1.3	1.3	1.7
Private Sector	1.6	1.0	1.0	1.6	1.2	1.3
WUAs	2.0	1.0	2.0	2.0	1.5	1.7
Majlis As-Shura	2.0	2.0	1.3	1.8	2.0	1.8
Courts	1.3	1.0	1.8	1.2	1.4	1.3
Average	**2.4**	**2.1**	**1.9**	**2.1**	**1.9**	

Organizing has the greatest collective organizational involvement. *Organizing* had the highest average involvement of any of the functions, with four different organizations scoring above a 3. The MRMWR had the highest involvement (4.2), followed by the Ministry of Agriculture and the Public Authority for Electricity and Water, which both scored 3.8. Only two organizations scored below a 2 in this function – the private sector, and the courts. However both of these organizations have extremely low involvement across the board.

Allocating and Regulating have the least collective organizational involvement. *Allocating* was the only function that did not have a score above 4 by any organization. The two organizations that scored 3.8 were the MRMWR and the Public Authority for Electricity and Water. This fits each of their roles in the water sector—the former allocates water generally, and the latter is responsible for providing drinking water and consults with the MRMWR on water allocation generally. Decision processes in *Regulating* are strongly influenced by the MRMWR, and partially also by the Ministry of Agriculture. The rest of the organizations examined in the matrix had very little involvement in this area.

Planning and Developing had average organizational involvement. Both the *Planning* and *Developing* functions had high involvement from the three most influential organizations in the country: the MRMWR, the Public Authority for Electricity and Water, and the Ministry of Agriculture. Most other organizations had very low levels of involvement in these areas.

Oman's water sector is highly centralized. Government organizations are by far the largest actors in Oman's water sector. Decisions are almost exclusively top-down, and all decisions pass through the MRMWR. This means that organizations like WUAs and NGOs are not very influential, and that government ministries are very influential. In fact, NGOs are almost nonexistent. WUAs are prominent at falaj level, but seem to have little influence on the national policy agenda.

Water Organizations tend to specialize. Within the framework of government institutions, particular organizations tend to be highly influential in certain areas. In the *Allocating* functions where the MRMWR and the MoA have the least influence, the Public Authority for Electricity and Water is highly influential in relation to domestic water only. Universities are important in the *Organizing* function, but hardly influential in other areas. When the Ministry of Environment and Climate Affairs separated from the MRMWR and Environment, it was given the task of water quality regulation. As a result, it is highly influential in the *Regulating* function.

The MRMWR is the primary water governance body in Oman. The MRMWR scored above a 4 in every area except for one (*Allocating*), in which it scored a 3.8. Survey results indicate that it is most involved in *Planning*, *Developing*, and *Regulating*. It was less involved in *Organizing* and *Allocating*, though it still received the highest scores of any organization in both areas. This result is expected—the MRMWR is the primary coordinating body for water governance in Oman and plays a large role in all of the functional areas in the country. It also coordinates with every other water organization in the country.

The Public Authority for Electricity and Water is highly influential across the board. The PAEW is the second most influential water actor in Oman. It received scores of above 3.5 in all but one area (*Regulating*), where it received only a 2.4. Interestingly, it had high influence in the area in which the other major actors in the water sector were least influential (*Allocating*). This likely indicates that it fills a specific role in the governance structure in the country. However,

this allocation is mainly dealt with in drinking or municipal water that originates from desalination plants. The low influence on the *Regulating* function is consistent with the PAEW's primary focus on development and implementation of projects that have to do with water distribution rather than regulation, which is mainly MECA's competence. Besides, PAEW is a relatively new institution and is expected to play an increasingly major role in regulations in the area of municipal water.

The Ministry of Agriculture plays a large role in water governance. The MoA appears to be the third most influential water organization in the country. The organization received scores of 3 or higher in all but one area, *Allocating*, though here it still received 2.8. The MoA appears to play a very large role in *Organizing* and *Planning*, and less of a role in other functions (*Allocating*, *Regulating*, Developing). This partially mirrors the goals of the MoA, which are focused on extension, research and development and optimization of water policies.

Ministry of Environment and Climate Affairs and Ministry of National Economy play peripheral roles in the water sector. Both Ministries are more involved in *Organizing* and *Planning* than *Allocating*, *Developing*, and *Regulating*, but neither shows high levels of overall influence. The only major difference between the influences of these Ministries is that the MCA has its highest level of influence in the *Regulating* function. This is likely because the MECA is in charge of regulating water quality and reporting to the MRMWR.

Universities play a specialized role in Oman's water sector. Universities were rated to be very influential in *Organizing*, and had low influence in all of the other areas. This is consistent with their established role in this field, which is to assist the Omani water sector with research, training staff, and data provision.

NGOs play a limited role. NGO presence in Oman in very limited, but they do appear to be somewhat influential in *Allocating*. This is an area in which organizations like the MRMWR and the MoA were least influential. This suggests that NGOs have a voice in the water allocation process, but have a limited role outside of that. NGOs also have some influence in the *Organizing* function.

Private Sector, Majlis As-Shura (Consultative Council), and WUAs have very little influence. Neither the private sector, nor Majlis, nor WUAs had more than a peripheral level of influence (i.e., all were less than 2), which is consistent with the strongly top-down Omani government structure, which leads to a high degree of centralization of power in a few governmental organizations, leaving little space for legislative or private sector (e.g., farmer organization) influence.

Courts are minimally involved in the water sector. Courts have the least influence of any organization on the water sector in Oman. However, courts do occasionally hear cases that have to do with water.

Summing Up. An examination of Oman's organizational structure related to water resources reveals no major gaps in functional coverage, with certain organizations filling very specific roles. Actors like the MRMWR and the PAEW are influential in all areas, but other actors like Universities and the MECA specialize in certain functions. NGOs and private organizations play a particularly small role in Oman, largely because of the dominance of Omani government water

institutions. WUAs play an important role in the agricultural water sector, as they control over 3,000 aflaj across the country. However, the O&F Matrix suggests that they have a very marginal influence in national decision-making processes.

5POLICY AND LEGAL ANALYSIS

This section summarizes the analysis of water governance capacity for Oman based on policy and legal documents. A total of 14 documents were analyzed (Annex 2). Though the documents themselves are all official, several were retrieved from online sources and it is thus not clear whether their translations were official or not. Since no policy documents could be obtained, all documents used for this analysis are legal in nature. The laws range in date from 1977 to 2006. Royal Decree 78 of 2004: the Law for the Regulation and Privatisation of the Electricity and Related Water Sector, and the Water Wealth Protection Law are the longest and most thorough of these documents.

FUNCTIONS

ORGANIZING AND BUILDING CAPACITY IN THE WATER SECTOR

Within the legal documents, overall support for function 1 is limited and not well-defined, though minimal support is found in several documents. Sub-function 1.2 is supported the most thoroughly, while 1.5 is not directly addressed.

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

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

Sub-function 1.1, creating and modifying an organizational structure, is focused mainly on the creation of the Public Authority for Electricity and Water (PAEW) to regulate the privatization of the electricity/water sector. A Ministry of Water Resources (MWR) is also established, which subsequently transitioned into the Ministry of Regional Municipalities, Environment and Water Resources (MRMWR). A Water Resource Council (WRC) is established through the Water Resource Development Law; MRMWR has since taken over all WRC responsibilities, though the document that mandates this was not available for analysis.

Sub-function 1.2, assigning roles and responsibilities, is the most developed sub-function. It is addressed in four of the legal documents. Roles and responsibilities of the various ministerial bodies that oversee the privatization of the water sector – including the MRMWR and the Ministry of the National Economy (MONE) – are outlined. Focus is on water management and conservation, resource development, regulation, and implementation.

Sub-function 1.3, setting national water policy, is addressed in several laws. Water is considered "national wealth" and Oman's national water policy emphasizes its careful management, development, use and protection. The focus is on: (i) privatization of the electricity/water sector, (ii) further development of water resources (including desalination), and (iii) protection of water quality.

Sub-function 1.4, establishing linkages among sub-sectors, levels, and national sub-regions, receives little attention. The documents address coordination between the ministerial departments and the government, as well as between institutions with a focus on the collection and maintenance of water-related data and the protection and development of water resources.

Sub-function 1.5, establishing linkages with neighboring riparian countries, is not addressed in any of the documents.

Sub-function 1.6, building public and political awareness, is addressed in two legal documents, that delegate responsibility to various entities for raising public awareness. Language surrounding program development and implementation is absent.

Sub-function 1.7, securing and allocating funding for the water sector, is addressed in four legal documents. Emphasis is on the privatization of the electricity/water sector, including project finance and budget reporting, and fees associated with wells.

Sub-function 1.8, developing and utilizing well-trained water sector professionals, is addressed in Ministerial Decision 2/1990 and Royal Decree 100/1989. Contractors are classified based on technical capabilities.

PLANNING STRATEGICALLY

Within function 2, sub-function 2.1 is supported the most, while sub-functions 2.2, 2.3, and 2.4 receive less attention. Overall, strategic planning in Oman's water sector, as it is established through function 2, emphasizes data collection and utilization relative to water quality and pollution standards. Despite the attention awarded to collecting and utilizing water-relevant data, the strategic use of short- and long-term supply and demand projections, along with the development of planning and management tools to support decision making processes remain underdeveloped.

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

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

Sub-function 2.1, collecting, managing, storing and utilizing water-relevant data, is addressed in the majority of Oman's legal documents. These documents present guidelines for conducting periodic sampling, using accepted testing methods and approved laboratory services, and evaluating test results against the acceptable ranges found in the water data tables. Data is also used to determine which type of infrastructure is most appropriate for dealing with wastewater from septic tanks.

Sub-function 2.2, projecting future supply and demand for water, is addressed in two documents. Royal Decree 100/1989 requires the MRMWR to assess Oman's water balance within the various geographic regions. Water Wealth Protection Law mandates the MRMWR to determine areas with abundant water supplies – "open areas."

Sub-function 2.3, designing strategies for matching expected long-term water supply and demand and dealing with shortfalls (including drought mitigation strategies), is addressed minimally in the Water

Resources Development Law. The Water Resource Council is responsible for developing proposals that address long-term water planning.

Sub-function 2.4, developing planning and management tools to support decision making, is not supported by Oman's legal documents.

ALLOCATING WATER

The allocation of water is primarily addressed through the permitting of private and public wells and aflaj, which considers not only the water yield of each individual well/aflaj but also the potential impacts of infrastructure construction or modification on nearby water resources. Water rights are separate from land rights, but well permits are generally only granted to the landowner where the well will be placed. While all four sub-functions are developed to some extent, 3.1 is the most supported.

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

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

* The scores in this table should not be given a great deal of weight, as subsequent analysis revealed additional relevant content that was not analyzed. The table is included for completeness.

Sub-function 3.1 is addressed in several laws and centers on awarding permits for agricultural, industrial, and other non-domestic uses; drinking and domestic uses are exempted. Water rights are granted and managed by the MRMWR. A major corollary responsibility of well owners is to monitor their water withdrawals to ensure withdrawals do not exceed the quantity specified in the permit.

Sub-function 3.2, establishing water and water rights transfer mechanisms, is addressed by the Water Wealth Protection Law. A permit is required for transporting and selling water.

Sub-function 3.3, adjudicating disputes, is addressed minimally. The appeals process for denied well permits is handled by the MRMWR itself.

Sub-function 3.4, assessing and managing third party impacts of water and water rights transactions, is addressed by one law. Impacts on neighboring wells and aflaj are considered in the permitting process for water sale and transport.

DEVELOPING AND MANAGING WATER RESOURCES

The content of function 4 is moderately supported by the majority of Oman's legal documents. Sub-functions 4.1 and 4.3 are the most detailed. Addressing public and private infrastructure – construction, operations, maintenance – are given the bulk of attention. While flooding, 4.5, is briefly mentioned, 4.2 is not addressed at all, which is understandable, given the very limited reliance placed on surface water in Oman.

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

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

Sub-function 4.1, constructing public infrastructure and authorizing private infrastructure development, is well represented in Oman's legal documents. A broad array of public and private infrastructure projects is covered, including the construction activities relating to existing and new water wells, septic tanks, holding tanks, soakaway pits, and diversion pipes and channels. Additionally, a specific authorization process is required for implementing new projects, which includes the consideration of impacts of development on local water resources.

Sub-function 4.2, forecasting seasonal supply and demand and matching the two, is not supported in any of the legal documents.

Sub-function 4.3, operating and maintaining public infrastructure according to established plans and strategic priorities, is moderately addressed within Oman's legal documents. Operation and maintenance responsibilities rest with either a Ministry or owners of land and water rights.

Sub-function 4.4, applying incentives and sanctions to achieve long- and short-term supply/demand matching, is addressed in several laws, primarily targeting water quality protection. The majority of the laws outline penalties for their violation. In addition, Royal Decree 115/2001 authorizes the State to establish fees for water services.

Sub-function 4.5, forecasting and managing floods and flood impacts, is awarded brief mention. A single provision mandates management of flood impacts through diverting surface water away from buildings.

REGULATING WATER RESOURCES AND SERVICES

Function 5 addresses the regulatory mechanisms in place for achieving goals related to water delivery, protection and services. The Oman documents reflect concerted attention to regulating waterways and protecting aquatic ecosystems, sub-functions 5.3 and 5.4. Enforcement actions for withdrawals and services, 5.2 and 5.5, receive moderate attention, while no attention is given to operating concessions, sub-function 5.1.

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

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

Sub-function 5.1, issuing and monitoring operating concessions to water service providers, is not supported in the documents.

Sub-function 5.2, enforcing withdrawal limits associated with water rights, is a regulatory component that complements sub-function 3.1. Two documents mention well water withdrawal limits, but do not quantify them. Meters are required in conjunction with well permits; quantities specified in each permit are to be strictly obeyed. Punishments for not adhering to withdrawal limits include fines, imprisonment and well backfilling.

Sub-function 5.3, regulating water quality in waterways, water bodies and aquifers (including enforcement), is supported by over half of the legal documents. Groundwater receives particular attention, and wellheads are specifically protected. Additionally, wastewater re-use is regulated. Untreated wastewater cannot be used for irrigation or drinking purposes, and wastewater must not be allowed to contaminate ground or surface water. Also included are regulatory requirements pertaining to holding tanks, septic tanks, soakaway pits, and the dumping of waste into marine environments.

Sub-function 5.4, protecting aquatic ecosystems, is moderately supported. In particular, the internal waterways, territorial waters, and exclusive economic zone are referenced along with aspects of their related natural surroundings or aquatic ecosystem. The language contained in these legal documents is aimed primarily at prohibited activities.

Sub-function 5.5, monitoring and enforcing water service standards, is moderately supported. Water services as evidenced through the provided documents focus on water quality for human consumption. Unbottled drinking water, delivered to the public via public distribution systems, wells, or aflaj, is heavily regulated. In addition, water service providers must comply with the national standards for potable water.

PROCESS FEATURES

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

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

	Legal Score
Transparency	3
Participation	2
Accountability & Integrity	2
Rule of Law	3
Responsiveness	2

TRANSPARENCY

Transparency is reasonably well supported in the documentation. Among the documents, transparency often manifests as legal notices published in the public register and Official Gazette. In addition, some openness in the decision-making processes is apparent, as Oman releases copies of emerging proposals as part of an effort to increase participation. Additional evidence of this process feature is lacking in the material.

PARTICIPATION

Legal documents provide moderate evidence of commitment to participatory processes associated with policy formulation and decision making, though it is not clear if these processes are universally applied (i.e. to all members of society) throughout water policy formulation and related decision making practices. Working committees on water safety and opportunities for public comment are two examples of participation in Oman. Several documents reflect a commitment to participatory processes that encourage and consider "other" voices.

ACCOUNTABILITY AND INTEGRITY

Three of Oman's legal documents moderately address the issues of accountability and integrity. A commitment to protecting the well-being of the general public and electricity and water related consumers is apparent, though not fully developed. Discrimination is also addressed – ensuring licenses and exemptions are correctly awarded and promoting competitive practices. However, by in large the references to accountability and integrity provide little to no detail.

RULE OF LAW

All but one of Oman's legal documents address the Rule of Law process feature. A significant number of references are made to other decrees and most provisions fall within the broad context of protecting the environment, ecosystems, waterways and other related sectors from the effects of pollution. In practice this translates to decisions being made in conformity with laws, regulations, and established practices and procedures and laws being applied impartially. For example, Ministerial Decision 2 states in its introduction that its regulations apply to all existing well owners.

RESPONSIVENESS

Though responsiveness is found in over half of the Omani documents, support is limited to brief verbiage. Provisions address this process feature in regard to customer welfare, liberalization, and citizen comments and objections.

CROSS-CUTTING CATEGORIES

WATER SOURCES

Groundwater supplies the bulk of Oman's freshwater; thus this water source receives significant attention. Activity prohibitions that can lead to groundwater pollution are a focus, as is protecting groundwater recharge/wellhead areas. Though surface water in the traditional sense (e.g. lakes, rivers) is scarce, Oman considers seawater out to the limt of its exclusive economic zone as surface water in some laws and thus surface supplies are addressed in several documents. On several occasions, the term "surface water" is also used to describe wastewater that flows through above-ground conduits. As there is a focus on protecting freshwater resources – ground and surface – legal provisions regulate derivative water re-use and discharge activities, as well as desalination and subsequent waste and brine disposal.

WATER USES

Omani attention toward water use focuses primarily on crop irrigation and municipal and industrial uses, with brief attention awarded to ornamental irrigation (other). There is no discussion of environmental, hydropower, fisheries, and navigation uses. Irrigated agriculture is a clear priority of the State, given the number of references made to the re-use of wastewater for irrigation purposes. Potable water sources are regulated to ensure safety and protection for municipal use, and licensure for community water wells is limited to drinking and domestic uses. One document regulates industrial water use and waste where pollution to waterways poses a threat. Finally, water use in "ornamental" areas is briefly addressed.

SUMMARY

Freshwater resources are extremely limited in Oman; thus careful regulation of existing resources is a key focus. As such, the country's water rights allocation system involves a strict permitting process that requires periodic renewal of licenses. While other water sources are mentioned among the documentation, permitting is addressed primarily for groundwater, specifically for wells and aflaj. Withdrawal quantities are specified in permits, and it is generally up to well owners to refrain from exceeding these quantities. In addition, protecting water quality by controlling the discharge of contaminated waste, is clearly important. The protection of sources of water, e.g. groundwater, and of water for a particular use, e.g. drinking, is emphasized in a number of documents. This emphasis on protecting the quantity and quality of the country's water resources is reflected somewhat in Oman's strategic planning, namely through the focus on data collection and dissemination.

The fact that Oman has created a Water Resources Ministry with wide-ranging responsibilities pertaining to the water sector affirms that the country values its water resources highly. Responsibilities of the MRMWR center on the development and conservation of water resources. The major institutional change apparent in the documentation is the move towards privatization of the electricity/water sector.

Overall, though several sub-functions are well developed, Oman's legal documents do not fully support any of the five broad functions. Of the standard water governance functions, it is Functions 2 and 3 that receive the least overall attention, in that emphasis within those functions is centered on only one sub-function. The remaining functions are addressed more broadly overall. Four sub-functions are not addressed whatsoever in the available legal documents – the topics of regional cooperation (1.5), decision making tools (2.4), matching seasonal supply and demand (4.2) and providing concessions to water service providers (5.1). The latter is somewhat surprising, given the emphasis on privatization in the sector, however it appears that privatization has been applied primarily to desalinated water supply and not to water service provision through private utilities.

The process features, in comparison, receive less attention overall. The documents suggest that Oman is attempting to make government decisions, including publication of new laws and policies, more transparent. Also, greater participation is encouraged, but language suggests that this is limited with regard to those that may participate. Accountability and integrity receive minimal attention. That said, the need to safeguard the public welfare, and particularly the more vulnerable members of society, is addressed in some documents. Several documents reflect a commitment to applying laws impartially and making decisions in conformity with existing laws; thus rule of law is supported within the documents. Responsiveness, though less evident, is demonstrated through changes made in response to the public interest and/or public demand.

In regard to water sources and usage, groundwater is valued highly, as it is the main supplier of freshwater in Oman. Ensuring its quality is thus a high priority. Surface water is also important, particularly seawater which serves as the source of a significant share of the urban water supply through desalination. Several laws protect marine waters out to the country's exclusive economic zone. Provision is made for the use of wastewater, but this is highly regulated and limited primarily to irrigation of ornamental vegetation.

In conclusion, the documents do not fully address all of the standard water governance functions and decision-making (process) features, but some of Oman's water resource priorities are evident from the 14 provided documents. The incomplete attention given to some functions and process features may be attributed to the lack of importance of these functions in Oman's water environment, or to the relatively small number of documents received or the fact that no policy documents were available for analysis. This would be especially true for function 2 (Planning Strategically), and may also be the case with some of the process features, especially if their emphasis has been more recent.

6 EXPERT-BASED WATER GOVERNANCE RATING

This section presents the results of an Expert-Based Assessment of water governance, undertaken in a Rating Session held in Oman in December 2009. The Rating Session was attended by 24 Omani experts affiliated with different sub-sectors and different water-related organizations (Annex 1). The analysis considers the experts' perceptions of effectiveness of the Omani water sector in the current (2009) and past (2000) performance of the five standard water governance functions. Also assessed is the extent to which five good governance decision-making features are present in decision-making related to key water challenges.

6.1 FUNCTIONAL EFFECTIVENESS RATING

Table 11 presents averaged participant responses, aggregated by function, for the functional effectiveness exercise. Table 12 contains average scores drawn from the twenty questions in the functional effectiveness exercise. Effectiveness increases with rising scores. Standard deviations are shown in Annex 3.

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

	2000	2009
F1: Organizing and building capacity in the water sector	2.5	2.8
F2: Planning strategically	2.7	3.0
F3: Allocating water rights	2.7	3.0
F4: Developing and managing water resources	2.5	3.0
F5: Regulating water resources and services	2.5	2.9

Fairly homogenous effectiveness levels across functions. In the assessment for 2009, *Planning*, *Allocating* and *Developing* all scored 3 out of 4, showing an interesting parity among effectiveness of these three functions. Furthermore, *Regulating* scored 2.9, only 0.1 below the other functions. *Organizing* was the water resources function performed least effectively in Oman, but that function also scored only 0.2 points lower here than other functions.

Moderate progress in the effectiveness with which Oman performs water sector functions. Oman experienced moderate across-the-board increases in functional effectiveness between 2000 and 2009. The largest improvement in effectiveness was experienced in *Developing* and *Regulating*. With limited water resources and increasing use, Oman is a country that needs to maximize the use of its scarce resources. The improvements in its functional effectiveness may reflect the premium placed on making the best use of what little is available.

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

Question		2000	2009
F 1	1. Roles and responsibilities of each department or agency are clearly defined	2.9	3.2
	2. Policy goals for the water sector are clearly defined	2.5	3.1
	3. The water sector is provided with sufficient funds to function properly	2.6	2.5
	4. National governmental agencies consult each other when taking decisions that impact multiple sectors	2.3	2.8
	5. National governmental agencies cooperate in the implementation of their policies where appropriate	2.4	2.9
	6. Regional governmental agencies are consulted when decisions that affect their region are taken	2.4	2.5
	7. Governmental agencies are staffed with sufficient and trained personnel to perform the assigned tasks	2.6	2.4
F 2	8. Future water supply and demand forecasts are based on good quality data	2.7	3.1
	9. Water resources data are collected regularly, continuously throughout the country	2.9	3.0
	10. Current strategies for long-term matching of supply and demand have been effective at matching supply and demand	2.5	2.9
F 3	11. Rules and procedures for assigning and recording water rights are clearly defined and functioning	2.6	3.1
	12. Rules and procedures for transferring water rights are clearly defined and functioning	2.8	3.0
	13. Disputes among water users are resolved effectively	2.6	2.9
F 4	14. Government agencies are effective at forecasting seasonal supply and demand and matching the two	2.3	2.7
	15. Government agencies effectively operate public water infrastructure	2.6	3.2
	16. Government agencies effectively maintain public water infrastructure	2.5	3.1
	17. Current incentives and sanctions (including water pricing) are effective at achieving long and short term supply/demand matching	2.4	2.7
F 5	18. Government agencies are effective at enforcing withdrawal limits that are established	2.5	2.8
	19. Official water quality standards in waterways are met	2.6	3.0
	20. Aquatic ecosystems are protected to the level specified by the government	2.5	3.1
	AVERAGE	**2.6**	**2.9**

Developing and Managing Water Resources. While this function was the weakest in the water sector in 2000, *Developing* has now improved to a high aggregate score (3.0) at present. The largest gains within this function came in the areas of operating and maintaining public water infrastructure, the first (operating) being the function receiving the highest score across the board

(3.2). The sub-functions "Forecasting seasonal supply and demand and matching the two" (Table 12, q. 14) and "Applying incentives and sanctions to achieve long and short term supply/demand matching" (q. 17) experienced a moderate improvement since 2000 and were both rated 2.7 in 2009.

Planning strategically. The current effectiveness with which Oman performs *Planning* is strong (3.0 on a scale of 4), and improved by 0.3 since 2000. The average score in Table 4 reflected responses to the assessment of three sub-functions: "Projecting future supply and demand for water" (q. 8), "Collecting, managing, storing and utilizing water-relevant data" (q. 9), and "Designing strategies for matching expected long-term water supply and demand" (q. 10). The first sub-function received good ratings, improving noticeably from an already relatively high score (from 2.7 to 3.1). The second area had less improvement but it still was rated 3.0 out of 4, showing that Oman's data collection may have been adequate in 2000. The third sub-function showed the largest improvement, rising from 2.5 in 2000 to a current level of 2.9.

Allocating Water. The effectiveness with which *Allocating* is performed is also strong, and showed improvement since 2000 to rise to a rating of 3.0. The greatest improvement in this function related to the sub-function "Awarding and recording water rights and corollary responsibilities" (q. 11), which increased from 2.6 to 3.1 during the past 10 years (Table 12). The other two areas also showed some improvement.

Regulating Water Resources and Services. While *Regulating* as a whole has not excelled since 2000, there have been large improvements in certain areas. Overall, *Regulating* improved by 0.4, to achieve an aggregate score of 2.9 out of 4 at present. The greatest improvement came in the area of protecting aquatic ecosystems (Table 12, q. 20), which was rated 3.1 out of 4, with a 0.6 increase from 2000 levels. The other sub-functions also showed improvement.

Organizing and building capacity in the water sector. According to the assessment, *Organizing* is the function that is performed least effectively, and showing the least absolute improvement in performance since 2000. Sub-functions showing a decrease in effectiveness were "Securing and allocating funding for the sector" (q. 3), and "Developing and utilizing well-trained water sector professionals" (q. 7). On the other hand, "Assigning roles and responsibilities" (q. 1) and "Setting national water policy" (q. 2) both received high scores, and improved in performance between 2000 and 2009. Together, these findings show that while the aggregate performance of Organizing may be somewhat lower than that of other functions, there are some areas that are substantially improved. Furthermore, irrespective of change over time, several areas are currently relatively strong within this function.

6.2 RATING OF PROCESS FEATURES

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

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

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

Challenge	Decision Process Feature					
	Participation	Transparency	Integrity and Accountability	Rule of Law	Responsiveness	Average
1. Drinking Water	2.4	2.4	2.0	3.1	3.2	2.6
2. Groundwater	2.3	2.1	2.1	2.9	3.0	2.5
3. National Water Policy	2.0	2.0	2.0	3.0	2.8	2.4
4. Water Quality	2.2	2.3	2.1	2.9	2.9	2.5
5. Matching supply-demand	2.5	2.4	2.1	3.0	2.9	2.6
AVERAGE	**2.3**	**2.3**	**2.1**	**3.0**	**3.0**	

Rule of Law and *Responsiveness* appear to be the strongest governance features and were rated highest in each of the challenge areas. The highest rating (3.2) came in the area of *Responsiveness* to the challenge of *Drinking Water*, followed by *Rule of Law* in *Drinking Water* (3.1).

Participation and *Transparency* both scored medially overall (both 2.3), with their lowest scores in the context of *National Water Policy*, and their best in the challenges of *Drinking Water* and *Matching Supply and Demand*. The scores of these two features across challenges appear to almost mirror each other, suggesting that poor transparency may engender poor participation, and vice versa.

The lowest rated feature is *Accountability and Integrity*, scoring only slightly higher than 2.0 on a scale of 4 on aggregate. The lowest score in this field came in the context of *National Water Policy*. Assessment of the level of *Integrity and Accountability* of decision-making in other challenge areas, however, was only minimally better.

The aggregated strength of governance processes was fairly constant across challenge areas. Strength of governance processes applying to *Drinking Water* was strongest, with *Matching Supply and Demand* close behind. The challenge with the weakest decision-making processes was *National Water Policy*, which received scores of 2.0 in three out of the five assessed features.

6.3 SUMMARY

According to the results of the expert-based assessment, Oman has similar levels of functional effectiveness across the five water sector functions. These scores generally showed moderate improvement since 2000. Nonetheless, one area, allocation of sufficient human and financial resources to the water sector, showed a negative trend.

Decision making features varied significantly from one another. *Rule of Law* and *Responsiveness* were particularly strong, while *Integrity and Accountability* was weakest.

7 DISCUSSION AND CONCLUSION

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

7.1 AREAS WITH HIGH CAPACITY

The expert-based assessment showed that, on average, all the functions exhibited similar and relatively good levels of performance. Conversely, the document analysis revealed that none of the five board functions are fully supported in the available legal texts. To identify areas of high capacity and areas where there is room for improvement it is necessary to get to the sub-function level. Indeed, the overall assessment by broad function does not reveal that each function has one or two sub-functions where most of the legal support is centered and performance is the highest. In general, there is a good correspondence between the level of legal support of a sub-function and the ratings received in the EBA.

Governance areas whose performance and legal support stand out are: in function 1, the definition of policy goals and the corresponding responsibilities to achieve those goals; in function 2, the collection and use of good-quality water data; in function 3 the awarding of water rights; in function 4, the construction and management of public water infrastructure; and, in function 5, the safeguard of water quality.

Sub-function 4.4, applying incentives and sanctions to achieve supply/demand matching, receives good legal support and only a moderate score in terms of performance, although this seems to have improved significantly during the past ten years.

Good governance process features that are rated higher in the EBA are Rule of Law and Responsiveness, which also receive a good level of attention in the legal documentation.

7.2 POTENTIAL CHALLENGES

Areas requiring attention also show correspondence between the degree of sub-function legal support and the perceived performance. Issues that present a potential challenge for the Omani water sector according to both the legal analysis and the EBA are: the level of training and staff available to perform the assigned tasks in the water sector; the central government's coordination with regional authorities; and the forecasting and matching of seasonal supply and demand. The enforcement of withdrawal limits receives moderate attention in the legal texts and is perceived to

have a moderate performance in practice. The securing of financial resources for the water sector, mainly through privatization processes, is moderately addressed in the legal texts but, in practice, it seems to be insufficient to provide the sector with the funds it needs to function properly. It may be that while the private sector has supplied funds for infrastructure development, that recurrent funding, particularly government funding for public sector agencies, is inadequate.

In a few cases, there seems to be a very limited legal support of some sub-functions, while their performance on the ground was rated from good to moderate. These are the sub-functions relative to water and water rights transfer mechanisms and the management of disputes among users. This can be due to the fact that undocumented informal mechanisms are operating, as in the aflaj, or that legal documents not provided for the analysis might actually be regulating those sub-functions.

Some sub-functions receive little or no attention in the legal documentation. In particular, the issuing and monitoring of concessions to water providers, the assessment of the impacts of water transactions on third parties, and building public and political awareness of water sector are minimally addressed in the available legal texts.

In terms of governance process features, transparency receives fairly good support in legal documents, but appears to be somewhat deficient in practice. Transparency, participation, and integrity/accountability all appear to provide scope for improvement in their application to decision-making processes.

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ANNEX 1. WORKSHOP AND RATING SESSION: LIST OF PARTICIPANTS

Oman Rating Session Participants

	Name	Organization	Department
1	Younis Said Al-Hajri	Choura Council	Water Committee
2	Ahmed Al-Ghafri	Consultant	Private company
3	Eisa Rashid Al-Gharibi	Ministry of Agriculture	Agricultural Research Center
4	Ali Al-Hamdi	MRMWR	Regional Dept
5	Khamis Aldaghaishi	Falaj Manager	Birkat Al-Mooz Falaj
6	Salah Al-Shoukeri	MECA	Water Protection
7	Ahmed Al-Busaidi	Sultan Qaboos University	Soil and Water
8	Ahmed Salem Saidi	MRMWR	Water Assessment
9	Khalifa Al-Higgi	MRMWR	Water Development Department
10	Ishaq Al-Jabri	Ministry of Agriculture	Irrigation
11	Mohamed Hilal Chikhan	Falaj Manager	Falaj Al-Malki
12	Aisha Al-Khatri	MRMWR	Monitoring
13	Ahmed Talib Al-Shaqsi	Public Authority for Electricity & Water	Water Department
14	Ahmed Khalef	MECA	Planning
15	Fahad Al-farsi	MRMWR	Dams
16	Abdullah Al rajibi	MRMWR	Regional Dept
17	Salem Al Jabri	Sultan Qaboos University	Soil and Water
18	Abdullah Al-Naimi	Public Authority for Electricity & Water	Water Department
19	Yahya Imem	MRMWR	Monitoring
20	Rashid Al-Kindi	MRMWR	Regional Dept
21	Addullah Al rawahi	MRMWR	Water Development Department
22	Saif Al-Amri	MRMWR	Aflaj Department
23	Mariam Al-Azri	Ministry of Agriculture	Irrigation
24	Hamed AlDhehili	Ministry of Agriculture	Agricultural Research Center
25	Khalid, S. N. Al-Houti	MRMWR	Regional Dept
26	Abdulbaqui Khabouri	Expert	Private Consultant Bureau

ANNEX 2. POLICY AND LEGAL DOCUMENTS

Legal Document Title and Date (Entity of Origin)

Ministerial Decision 2 of 1990: Regulations for Registration of Existing Wells and New Well Permits (MRMWR)

Ministerial Decision 5 of 1986a: Regulations for External Building Drainage (MEWR)

Ministerial Decision 5 of 1986b: Regulations for Wastewater Reuse and Discharge (MEWR)

Ministerial Decision 145 of 1993: Regulations for Wastewater Reuse and Discharge (MRWE)

Ministerial Decision 192 of 2000: Determination of the Dhahira Region Water Supply Wellfield Protection Zones (MRMWR)

Ministerial Decision 421 1998: Regulations for Septic Tanks, Soakaway Pits and Holding Tanks (MRWE)

Omani Standard 8 2006: Unbottled Drinking Water (MCI)

Regulations on Drainage of Liquid Wastes into the Sea 1984: (CCEPP)

Royal Decree 29 of 2000: Water Wealth Protection Law

Royal Decree 78 of 2004: The Law for the Regulation and Privatization of the Electricity and Related Water Sector

Royal Decree 100 of 1989: For the Establishment of the Ministry of Water Resources and Designation of its Duties and Responsibilities

Royal Decree 114 of 2001: Issuing the Law on Conservation of the Environment and Prevention from Pollution

Royal Decree 115 of 2001: Issuing Law on Protection of Sources of Potable Water from Pollution

Water Resources Development Law 1977 (Sultan)

ANNEX 3. STANDARD DEVIATIONS OF THE EXPERT-BASED ASSESSMENT SCORES

Question		2000	*SD*	2010	*SD*
F 1	1. Roles and responsibilities of each department or agency are clearly defined	2.9	*0.7*	3.2	*0.7*
	2. Policy goals for the water sector are clearly defined	2.5	*0.7*	3.1	*0.7*
	3. The water sector is provided with sufficient funds to function properly	2.6	*0.9*	2.5	*0.6*
	4. National governmental agencies consult each other when taking decisions that impact multiple sectors	2.3	*0.7*	2.8	*0.6*
	5. National governmental agencies cooperate in the implementation of their policies where appropriate	2.4	*1.0*	2.9	*0.7*
	6. Regional governmental agencies are consulted when decisions that affect their region are taken	2.4	*0.7*	2.5	*0.6*
	7. Governmental agencies are staffed with sufficient and trained personnel to perform the assigned tasks	2.6	*0.9*	2.4	*0.6*
F 2	8. Future water supply and demand forecasts are based on good quality data	2.7	*0.8*	3.1	*0.5*
	9. Water resources data are collected regularly, continuously throughout the country	2.9	*1.0*	3.0	*0.7*
	10. Current strategies for long-term matching of supply and demand have been effective at matching supply and demand	2.5	*0.8*	2.9	*0.8*
F 3	11. Rules and procedures for assigning and recording water rights are clearly defined and functioning	2.6	*0.9*	3.1	*0.7*
	12. Rules and procedures for transferring water rights are clearly defined and functioning	2.8	*0.9*	3.0	*0.7*
	13. Disputes among water users are resolved effectively	2.6	*0.9*	2.9	*0.7*
F 4	14. Government agencies are effective at forecasting seasonal supply and demand and matching the two	2.3	*0.7*	2.7	*0.8*
	15. Government agencies effectively operate public water infrastructure	2.6	*0.8*	3.2	*0.7*
	16. Government agencies effectively maintain public water infrastructure	2.5	*0.8*	3.1	*0.8*

	17. Current incentives and sanctions (including water pricing) are effective at achieving long and short term supply/demand matching	2.4	*0.8*	2.7	*0.7*
F 5	18. Government agencies are effective at enforcing withdrawal limits that are established	2.5	*0.9*	2.8	*0.8*
	19. Official water quality standards in waterways are met	2.6	*0.8*	3.0	*0.8*
	20. Aquatic ecosystems are protected to the level specified by the government	2.5	*0.8*	3.1	*0.7*