

Crisis in Jordan's Water Sector? Understanding the Dynamics of Institutional and Political Constraints in Water Management and Corporatization Reforms

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Basil Riad Mahayni

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Abdi Ismail Samatar

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Dedication

I dedicate this dissertation to my family.

Abstract

Since 1999, Jordan has experimented with various forms of privatization and corporatization reforms in Amman's municipal water services and the national water sector. The goal of these reforms, it is argued, is to improve water management conditions in light of its stark lack of domestic water and energy resources and ongoing political and economic impacts of regional wars and conflicts. The reforms, however, experienced numerous setbacks. This dissertation seeks to understand why the privatization process has struggled and the effects it has generated. Privatization reforms come after nearly fifty years of World Bank and USAID sponsored water sector development projects in Amman specifically, and Jordan more generally. These projects were part and parcel of Jordan's state building processes and modernization of municipal and national water services.

The overall claim in this dissertation is that these state building and modernization processes created institutional and political constraints, which have become endemic to, and evolved with, water sector operations and reforms. Four sub-claims are offered. First, advocates of privatization and corporatization depict water sector crises through economic and engineering frameworks, which neglect considerations of political and institutional dynamics. Second, contemporary water crises are strongly influenced by the history of water sector development and state building processes, on the one hand, and the imbricated evolution of municipal and national water policies and institutions on the other. These processes resulted in political and institutional constraints that have become part and parcel of the water sector's operational dynamics and continued transformation. Third, corporatization reforms have been shaped by these institutional and political

contexts, while also introducing new constraints that further change the dynamics of the water sector. Last, reform programs and the design of municipal water services shape household experiences, while their opinion of reform processes remains critical for understanding the likelihood of more contentious reform programs.

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List of Acronyms

AWSA Amman Area Water and Sewerage Authority

DWSC Domestic Water Supply Corporation

CIP Capital Investment Project

CWA Central Water Authority

IRG International Resources Group

ISSP Institutional Support and Strengthening Program

IWRM Integrated Water Resources Management

JVA Jordan Valley Authority

LEMA Lyonnaise de Eaux – Montgomery Watson – Arabtech Jardaneh

MWI Ministry of Water and Irrigation

NRA Natural Resources Authority

NRW Non-Revenue Water

PMU Performance Monitoring Unit

USAID United States Agency for International Development

WAJ Water Authority of Jordan

WDMU Water Demand Management Unit

Chapter 1 Institutional and Political Constraints in Water Management

Introduction

Privatization initiatives in municipal water services have been a key topic of debate within international development and academic circles (see Harris, Goldin, and Sneddon 2013). Privatization programs have been diversely implemented in various economic, social, political, and economic contexts, especially in the global South, and produced mixed results (Bakker 2010; Budds and McGranahan 2003). Mainstream proponents of privatization programs argue that public sector management has failed due to poor budget management, ineffective oversight and expansion of municipal water services, and mismanagement within the institutions and of water resources (World Bank 2004; World Bank 1993). Critical scholars, on the other hand, argue that privatization initiatives introduce profit and cost-recovery frameworks that fail to improve water services and often negatively affect access to water in low-income communities (Bakker 2010; Swyngedouw 2005). More recently, academics have noted that privatization has increasingly fallen out of favor among mainstream development networks (de Gouvello and Scott 2012) and that the failures in public and private management regimes have much in common (Bakker 2013; Bakker 2010).

Though the literature on privatization in municipal water services is extensive, there has been limited research on how constraints to municipal water services shape outcomes of reform initiatives. Understanding the dynamics, or failures, of reforms requires attention to how constraints are represented, produced, and evolve over time. Critical academic scholarship on scientific representation and modernization (Linton 2010; Mitchell 2002; Scott 1998), state building processes in the water sector (Haines

2010; Baker 2005; Lansing 1991) and urban water governance scholarship addressing the social and economic power over urbanization processes (Dill and Crow 2014; Gandy 2006; Kaika 2005; Swyngedouw 2004) can help close this gap. This dissertation draws on these three general bodies of literature, alongside key research on dynamics of privatization and their impacts on households (Harris, Goldin, and Sneddon 2013; Bakker 2010) in order to better understand how the failures of privatization reforms are related to, or shaped by, past water sector development initiatives. In particular, the dissertation frames municipal water management failures in the public and privatization eras through the ongoing evolution of municipal and national water services. The case of Amman, Jordan is a useful example for addressing this gap in academic literature.

Mainstream academics and policymakers advocating for privatization claim that the Amman's municipal and Jordan's water sector challenges stem from extensive water scarcity, rapidly growing population, and mismanagement and institutional overlap, which has led to rapidly depleting supplies and excessive fiscal deficits. Mainstream perspectives frame these constraints through engineering failures and poor economic governance. This research attempts to reframe the debates around Jordan's water crises by focusing on the ways that political and institutional constraints have been produced, transformed, and reinforced through the implementation of water sector development projects throughout the history of Amman's municipal water services and Jordan's water sector. This dissertation thus examines the following overall question: how have fifty years of municipal and national water sector development affected municipal and national water management and reform processes?

Amman's municipal water services have been strongly shaped by state building initiatives and international donors financing the development and expansion of water sector infrastructure in ways that created and cemented both institutional and political constraints to water management. Many of these constraints carried into, and evolved with, the privatization initiatives, and ultimately influenced project outcomes in negative ways. Unfortunately, there is a dearth of critical academic scholarship on urban water governance in Amman and Jordan specifically, and Middle Eastern cities more generally. Academic literature on Amman's municipal water services have focused on the dynamics of expansion of water distribution, forms of water access, and inequalities in consumption (Darmame and Potter 2011; Potter and Darmame 2010; Gerlach and Franceys 2009; Potter et al. 2009). This scholarship, however, has not examined these issues within the context of national water management policies or constraints to the national and municipal water sectors.

Misrepresenting these constraints as symptoms of management failures rather than an endemic characteristic of the municipal and national water services can shape perceived planning options, like privatization, capacity for reform, and ultimately the outcomes of water sector development projects. As such, this dissertation argues that it is important to understand how institutional and political constraints are produced in, and change, national and municipal water management. Institutional and political constraints are strongly related, if not mutually reinforcing. Institutional constraints reflect the various factors that affect the financial, policy, legal, and decision-making processes. For example, how do legally defined institutional responsibilities compare to realities of operational dynamics? Similarly, how do operational expenditures, capital investments,

sources of water loss and revenue, and donor financing, interest, and conditions collectively interact to shape a water sector's financial flexibility? Political constraints represent the influence expressed by appointed officials or the ways that regime security, geopolitical interests, or public opinion shape decision-making processes and outcomes. The institutional and political constraints produced early in the state formation process have evolved with the implementation of water sector development and reform projects, and in turn shaped the outcomes of these projects in both the modernization and privatization eras.

The argument in this dissertation is developed in four ways. First, the dissertation evaluates mainstream and academic discussions about Amman's municipal water crises and reframes these debates within the political and institutional constraints affecting the municipal and national sectors. Second, the dissertation situates these institutional and political constraints within the history of state formation and institutional development of Amman's municipal water services and Jordan's national water sector. Third, the dissertation highlights how the political and institutional constraints have carried into the dynamics of the privatization reforms implemented since 1999. Last, the dissertation explores household experiences with municipal water services in order to reveal how these constraints affect access and consumption.

This chapter begins with a discussion of mainstream perspectives on water management crises and advocacy of privatization. It synthesizes academic critiques of privatization initiatives with research on state and urban development, management, and governance. Further, it provides a short note on the methods used and outlines the nature

of the research conducted in Amman, Jordan. Finally, this chapter provides an overview of the four empirical chapters and the concluding remarks.

Mainstream Perspectives on Water Management Crises and Privatization

Since the early 1990s, the World Bank has advocated for the privatization of municipal and national water sectors and greater incorporation of demand management in order to alleviate the rapid decline and degradation of water resources and improve management practices in institutions in order to equitably expand services and achieve cost recovery (World Bank 2004; World Bank 1993). Without reform, the World Bank argued, public health crises, depleted groundwater reservoirs, and irreversible damage to surface water resources will continue unabated. In response to these crises, analysts have conceptualized “soft alternatives” to “hard path” engineering solutions and developed new methods of calculation and management frameworks to better monitor the intricate relationship between water and ecosystem services, public health and economic development (Gleick, Chalecki, and Wong 2002). These analytical frameworks serve two related purposes: 1) delineating the nature of urban water crises and 2) providing evidence for why privatization is necessary. Collectively, they frame the nature of urban water management crises and facilitate the potential for particular types of reforms. This framing, however, ignores how political and institutional constraints affect the water sector and management failures.

Water Scarcity Indices and Analytical Frameworks

Fundamental to understanding support for privatization and demand management are the analytical frameworks that frame the urban water crises. One of the principal claims of privatization is that market practices can help restore severely depleted water resources and improve institutional governance. A key source of evidence used by privatization advocates is baseline indices of water availability and per capita stocks. The most prominent of these is the Water Scarcity Index (WSI), which measures and categorizes water availability per capita into three blocks: 1) water stress – 1,000 cubic meters to 1,700 cubic meters of freshwater per capita, 2) water scarcity – 500 cubic meters to 1,000 cubic meters, and 3) severe water scarcity – less than 500 cubic meters of freshwater per capita (Falkenmark 1989). Ohlsson's (2000) Social Water Scarcity Index (SWSI) elaborates on the WSI by incorporating the UNDP's Human Development Index as a proxy measure of adaptive capacity related to economic, technological, and political variables for sustainable use of water and equitable distribution (Ohlsson 2000; Rijsberman 2006).

A number of institutions and researchers have developed similar indices. Examples include the Basic Human Needs Index, Water Resources Vulnerability Index, Index of Relative Water Scarcity, Index of Human Security, Human Development Index, and the Water Poverty Index (Gleick, Chalecki, and Wong 2002). For example, the Basic Human Needs Index recommends 40 to 50 liters per day per person for drinking, cooking, and sanitation—a quantity that has not yet been universally met. Similarly, the Water Poverty Index measures household and community access to potable water resources (Sullivan 2002; Sullivan, Meigh, and Giacomello 2003) based on the

International Water Management Institute's (IWMI) definition of economic water scarcity, which describes the availability of water resources in relation to investment capacity and infrastructural development (see Rijsberman 2006). Such indices are utilized as evidence for the argument that new forms of market based management and resource governance can reverse the decline and degradation of water resources and increase per capita availability.

There are several problems with such indices. First, such indices are highly sensitive to sudden fluctuations in numbers. For example, Jordan is often referred to as being among the ten most water scarce countries in the world according to the Falkenmark Index. In 2014 Jordan's ranking jumped to the second most water scarce country in the world due to the significant increase of Syrian refugees (Namrouqa 2014). With respect to the Water Scarcity Index, the increase in Syrian refugees translated into an overall increase in demand. The index, however, ignores varying water use practices across socio-economic classes and water allocations between different sectors of the economy.

Second, such indices are often plagued by the lack of consistency in data measurements and data sharing. Information about water resources is often considered a matter of state security and is not readily available for researchers or development institutions. Related, water officials do not always effectively or consistently measure water consumption or available resources. For example, the Water Authority of Jordan is unable to provide production and consumption trends from the last fifty years due to poor monitoring practices and the failure to maintain reliable water meters for government wells and springs throughout the country. This results in significant estimation of water

production values and non-revenue water loss. Lastly, the indices fail to reflect scale and geography, particularly the regional distribution of water and the type of water available in different locations. In the case of Jordan, water is not equally distributed between the northern, central, and southern governorates, forcing authorities to rely on a major bulk water distribution system to provide for major demand centers. The indices do not reflect the distribution of water throughout the country and the bulk water delivery system.

This latter point is among the most prominent critiques leveraged in mainstream circles where it is argued that baseline indices privilege surface and groundwater resources over water embedded in soils and vegetation and the reuse of treated wastewater. This generates a scientifically flawed characterization of water availability and thus skews policy and development plans. Allan (2002) argues that it is essential to account for other forms of water when calculating resource stocks. For example, water utilized in agricultural production, such as soil moisture, is as fundamental to crop production as direct watering practices. He differentiates between blue water, which refers to surface and groundwater resources, and green water, defined as the water embedded in soil profiles and vegetation. Haddadin (2006) adds “shadow water” to this list, or water lost to evapotranspiration. Most scientific studies of water scarcity dismiss “green water” and “shadow water” despite their significant influence on agriculture and water deficits. The concept of “virtual water” attempts to redress the limitations in existing water scarcity studies by calculating comparative advantage in use of “blue” and “green water” in commodity production (Allan 2002).

Allan (2006) also distinguishes between “big water” and “small water” scarcity. “Big water” scarcity refers to the negative effects on agriculture and food production

when water supplies are limited due to depleted surface and groundwater resources. “Small water” scarcity characterizes the challenges in allocating scarce water resources for cities and industry. For Allan (2006), the key to effective use of scarce water supplies is to diversify economies away from water intensive activities by importing these commodities, including food, which can free surface and groundwater resources for immediate societal and industrial needs. The problem remains, however, that food policies are often enmeshed in geopolitical relations across nation-states. Agricultural production in general is highly politicized component of most economies (Johnston et al. 2010) in addition to the fact that it is difficult to adequately measure “virtual” or “shadow” water (Mahayni 2013a).

Perhaps more worrisome than the debates over how to calculate water scarcity is the lack of attention to water quality issues due to the widespread implications for public health, livelihoods, and ecosystem services (Biswas and Tortajada 2011; see also UNESCO 2009; UNESCO 2006; UNESCO 2003). Policy makers, planners, and public health experts stress that poor water quality intensifies public health crises in the global South, particularly in urban areas. According to the UN World Water Development Report (UNESCO 2009), one to two million people, 90% of whom are children, die each year from preventable diseases caused by contaminated water, limited access to sanitation, and poor hygienic conditions. In many of these communities, structural barriers such as inadequate housing, subpar sanitation, and limited livelihood opportunities constrain their options for water access and use. Development organizations seeking to address public health issues involving water access risk reinforcing the crises or marginalizing groups within communities who do not have access to power or

influence if local community dynamics or the nature of water availability are not adequately understood (Sultana 2009).

The number of variables that must be accounted for in urban water systems necessitates intricate and complex managerial frameworks and concepts. A number of these have been developed in recent years, including integrated water resources management (IWRM), water security, governance, and resilience. Most often, these have been linked to economic frameworks on resource allocation and prospects for development. The two most common, and perhaps most important for understanding the widespread implementation of privatization in municipal water services, are IWRM and governance. In the last several years, however, as climate change dominates international development agendas, resilience has also become a critical topic of debate, in particular the role of market-based management of water resources and services. Collectively, these topics of debate are considered to be an alternative to more traditional, engineering-oriented solutions.

Soft Path Alternatives to Hard Approaches: IWRM, Governance, and Privatization

Since the early 1990s, mainstream analysts have advocated for “soft” path approaches, including integrated water resources management and governance, instead of “hard path” engineering solutions. For much of the 20th century, water management was based on large-scale engineering projects, including the construction of dams and water transfer infrastructure, to increase water production capacity and economic development (Gleick 2003). The “hard path” approach no doubt improved economic development in many countries, but it also produced unanticipated social, economic, and environmental

problems. For example, major dams that improved irrigation capacity also generated irreversible damages to the ecosystems, displaced thousands of families from their homes, and created public health crises due to exposure to waterborne diseases (Gleick 2003; Mitchell 2002). Similarly, new technologies and infrastructure allowed for the major transfer of water at low prices, facilitating industrial and agricultural development. Over time, however, surface and groundwater resources have shown signs of stress and depletion due to the unsustainable rate of water use (Gleick 2003; Swyngedouw 2007a).

By the 1970s, the “hard path” approach demonstrated its limitations as the finite state of freshwater resources (Postel 1997) and significant regional disparities in water availability (Gleick, Chalecki, and Wong 2002) heightened concerns about unsustainable water use, growing demand, and rapid deterioration and depletion of freshwater resources. Gleick and Palaniappan (2010) draw parallels between the global water crisis and theories of peak oil. The theory of peak oil argues that the rate of oil production, over time, grows as demand increases and costs of production decline. As oil reserves decline, costs increase and production levels off. The subsequent decline is defined as the rate of production eclipsing new oil reserves.

Water’s biophysical characteristics, however, require tweaking the peak resource framework. Water consumption depends on human, agricultural, and industrial demand. Ecosystem services also have to be factored into water consumption. Further, unlike oil, there are no alternatives to water. Many groundwater reservoirs, for example, are non-renewable. Thus, while oil declines can be offset through alternative forms of renewable energy, water cannot be replaced. The finite amount of water resources has implications for human, industrial, and agricultural demand, and for ecosystem services. Rapidly

declining water resources, therefore, must be offset by the production of new supplies, higher prices, and careful allocation decisions (Gleick and Palaniappan 2010).

In light of the fears over the state of freshwater resources, scholars and policymakers have called for greater demand management. This “soft path” approach to water management shifts the emphasis from production of new supplies to more efficient water distribution to meet end-user needs and well-being, economic considerations like water prices, and social and cultural norms (Gleick 2003). One of the fundamental assumptions of the “soft path” approach is consumer flexibility in water use (Wolff and Gleick 2002), which resonate with advocates of privatization who argue that demand management is a critical element of water management (Brooks 2005). This requires greater democratization and decentralization of water management decisions and institutions (Wolff and Gleick 2002), treating water as a commodity in water policy, and taking in account the importance of water for ecosystem services (Brooks 2005).

The prioritization of “soft path” solutions, particularly governance and integrated water resources management (IWRM), has taken place alongside a greater insistence on market-based management. In the 1992 Dublin Statement of Water and Sustainable Development, water policy experts first defined water as a commodity and highlighted IWRM as a key priority for urban water management reforms. The Global Water Partnership defines IWRM as “a process which promotes coordinated development and management of water, land and related resources in order to maximize economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems and the environment” (Global Water Partnership 2010). By the 2002 Summit on Sustainable Development in Johannesburg, South Africa, IWRM was among the

leading priorities for sound and sustainable water management (United Nations 2002). More recently, international analysts have posited adaption as a key characteristic of IWRM, to cope with increasingly challenging and rapidly changing environmental and humanitarian contexts (UNESCO 2012a).

A principal mechanism that makes IWRM possible is governance. Governance is defined 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” (De Stefano et al. 2010, 2).¹ According to the UNESCO World Water Development Report (UNESCO 2012a), governance is important because “water is not *only* a sector, but also a necessary element that provides benefits for all sectors, thus requiring active consultation with, and coordination among, the sectors and communities that depend on it” (24). The water crisis in the Middle East, according to one UN report, is a crisis of governance. The report states,

All water resources urgently require efficient, sustainable management. As water becomes scarcer, governance must ensure that all sectors agricultural, industrial, and municipal and users have equitable, reliable, and sustainable access to water and are using water efficiently...Key elements of good water governance include equity, transparency, accountability, environmental and economic sustainability, stakeholder participation and empowerment, and responsiveness to socio-economic development needs...the Arab region’s current political and economic transformations assist efforts to reform water governance, while effective water governance systems can in turn catalyze region-wide aspirations for overall governance reform (United Nations 2014, 1–2).

¹ De Stefano et al. (2010) argue that good water governance entails the following features: “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 formation 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” (3).

Good governance helps ensure that water is equitably and sustainably allocated between competing sectors and ecosystem services through decision-making processes structured through market mechanisms.

Market-based management and decentralization can deliver a more reliable valuation of scarce water resources, help finance expensive water infrastructure, ensure cost-recovery, and allow for the equitable distribution between competing sectors (Bakker 2010; Goldman 2007; World Bank 2004; World Bank 1993). One World Bank report notes,

Water resources should be managed in the context of a national water strategy that reflects the nation's social, economic, and environmental objectives and is based on an assessment of the country's water resources. The assessment would include a realistic forecast of the demand for water, based on projected population growth and economic development, and a consideration of options for managing demand and supply, taking into account existing investments and those likely to occur in the private sector. This strategy would spell out priorities for providing water services; establish policies on water rights, water pricing and cost recovery, public investment, and the role of the private sector in water development, and institute measures for environmental protection and restoration (World Bank 1993, 41).

Decentralization, furthermore, is a necessary step for market-based management in order to reduce political influence over decision-making authorities within public institutions and ensure that the private sector and the public are engaged in decision-making processes. Decentralization and the introduction of market-based management require new regulatory institutions and water laws friendly to the private sector. There are many ways that the private sector has been, and can be, incorporated into municipal water management, including outright privatization, concession agreements, leasing, and management contracts. No matter the form, the fundamental basis of privatization generally is to transform municipal water services in ways that enhance cost-recovery,

improve the conditions of water supplies and infrastructure, and expand equitable access to municipal water services.

There are several tensions inherent to the governance and IWRM frameworks, particularly as they relate to privatization. First, IWRM has become a prescriptive recommendation. Giordano and Shah (2014)(2014) note that after the 2002 summit in Johannesburg, international donors have increasingly required IWRM language in project proposals. Second, IWRM is now treated as an end rather than a means. By treating IWRM as an end, analytical frameworks and definitions in IWRM plans, such as river basins, are often presented with clear-cut and uncontroversial, which facilitates the repackaging of conventional development plans through IWRM frameworks and reinforce the ecological and developmental status quo (Molle 2009). Biswas (2004) also criticizes IWRM for the failure to define integration, what it looks like, or how it should be implemented.

Related, governance has also become an apolitical concept despite the fact that it seeks to invite more collaboration from the private sector and community groups. In mainstream circles, governance has been reduced to a series of indicators and best practices that discount the importance of context (Biswas and Tortajada 2010). Some cases may reflect poor governance despite significant improvements in municipal water management while others may be said to reflect good governance because benchmarks are met despite failing to improve management conditions (Biswas and Tortajada 2010). The ultimate irony of mainstream governance debates is that political negotiations in the decision-making processes are supposed to operate in depoliticized environments (Bakker 2010). Bakker (2010) critiques mainstream perspectives on water governance

because they de-politicize participation in decision-making, transparency and accountability. Harris, Goldin, and Sneddon (2013) argue that the insistence on de-politicizing governance has popularized governance as a research and policy topic,

An internet search for the word governance yields 45,300,000 hits, of which, 17,000,000 are for 'good governance', a theme tightly connected to words such as democracy, accountability, and transparency. Indeed at several recent high-profile water meetings and in several publications, the water community has increasingly emphasized that the global water crisis is centrally a crisis of governance (3).

The problem here is that separating governance from politics discounts or marginalizes the reality of power systems in decision-making.

In fact, research shows that decentralizing water governance reconfigures power structures of intermediaries at local and regional scales (Medd and Marvin 2008). There is an inherent tension in the decentralization and de-politicization of decision-making processes as community groups and private sector actors necessarily carry their own agendas (Herrera and Post 2014). Indeed, the pursuit of 'good governance' in weak regulatory contexts can lead to private-sector capture of water markets (Hepworth 2012). Bakker (2010) therefore offers an alternative definition of governance as "a process of decision making that is structured by institutions (laws, rules, norms, and customs) and shaped by ideological preferences" (Bakker 2010, 44). Bakker's (2010) notion of governance differs from conventional notions as she locates politics and power at the center of resource allocation debates.

Others locate social justice at the center of a politically-rooted conceptualization of governance, as equitable access to water and decision-making processes are essential for a healthy municipal water sector and society (Perreault 2014). This is key because public and private sector organizations can privilege and prioritize elite interests over the

needs of poor communities, and have the effect of limiting their capacity to petition water services (Bakker et al. 2008). In some cases, citizens may turn to alternative water services in the informal markets to the detriment of their health and socio-economic conditions (Bakker et al. 2008). This is alarming since citizenship and modern subjectivity are closely tied to formal water access (Ranganathan 2010; Kaika 2005). As such, Bakker's (2010) contribution moves away from the static characterizations of governance, as measured or depicted through 'best practices' or indicators. Instead, her notion of governance attends to the ways that public and private institutions and community groups, mediated by imperatives and incentives, shape governance outcomes.

The need to re-politicize conventional debates around governance and IWRM is critical because water scarcity concepts and indices have become powerful tools for interpreting crises and informing policy. These indices serve as reference points for policy recommendations through their framing of access inequalities, whether they are due to poor water infrastructure, management failures, or disproportionate use by particular sectors of the economy (Rijsberman 2006). The framing associated with these concepts and indices feed into policy recommendations such as IWRM, governance, and privatization initiatives, broadly speaking. There are, however, inherent limitations in what the concepts and indices seek to show and what soft path solutions seek to realize. Water and poverty indices do not acknowledge the power of intermediaries to shape access to and use of water, likely resulting in inadequate policy recommendations (Bakker 2010), and the politically charged decisions related to water allocation between different economic sectors (Rijsberman 2006). Similarly "soft path" approaches, specifically their relationship to privatization, decentralization, and demand management,

rely on a static or depoliticized understanding of the urban water sector dynamics. Nevertheless, these tools and frameworks have not only dominated mainstream debates, they have proven instrumental in ushering in a broad wave of demand management programs and privatization measures into water sectors throughout the global South (Harris, Goldin, and Sneddon 2013).

Perhaps the most fundamental limitation of mainstream advocacy of privatization is the misrepresentation of municipal water management crises and the failure to understand the contextual history of water sector development. While academic literature on privatization highlight the limitations and negative effects of such programs, it does not examine privatization within the context of state building and relationship to the development of municipal water services. The next section helps close this gap by reviewing and linking literature pertaining representation and development, scholarship on the relationship between state building and water services, and the history of municipal water services in order to reframe debates on privatization programs in municipal water services. The argument is that state building and formation processes led to and shaped institutional and political constraints that affect urban water management institutions and capacity for reform both prior to privatization in municipal water services and during the privatization processes. This argument reconsiders the failures of privatizing municipal water services within an analysis of how the past development projects and reforms created a constrained regulatory and policy environment.

Critical Perspectives on Water Management Crises and Privatization

Academics have critiqued mainstream characterizations of water management crises and privatization in three ways. First, scholars argue that water management crises stem from the power over production and distribution, which leads to a reduction of water supplies and unequal access. Second, scholars claim that the nature of water planning and management has facilitated the concentration of state power in the pursuit of modernization initiatives to the detriment of water resources and equitable access. Third, academics have critiqued privatization for the ways it reprioritizes profit over equitable distribution and the unequal effects on low-income communities. This section seeks to situate the scholarly critiques of privatization within the literatures on the political economic history of urban water management and state and development planning. Academic scholarship on histories and dynamics of state building vis-à-vis water management can help generate a deeper understanding of the evolution of urban water management in periods of modernization and privatization through an analysis of how political and institutional constraints arise through water sector development and in turn influence management outcomes today.

Critiques of Representation and their Relationship to State Building

Mainstream analysts emphasize that privatization is a necessary step for mitigating the crises produced by modernization programs in municipal water services. Scholars, however, argue that contemporary water management crises stem from a tension between modernist visions for municipal and national water sectors and the reality of human-environment relationships. As such, it is important to pay attention to

the ways that water management and water sector development is framed and to what effect. Scholarship about representation in development clarifies how state making and formation (Baker 2005) become viable political projects through managerial interventions in society (Foucault 2010; Mitchell 1988) and the environment (Agrawal 2005; Mitchell 2002; Stengers 2000; Scott 1998).

The ideas of abstraction (Stengers 2000), enframing (Mitchell 1988) and legibility (Scott 1998) offer three similar ways for understanding how society and water systems were empirically and conceptually framed in the modernization of national and municipal water sectors.² All three argue that scientists and experts assume the social and environmental worlds to be divided and ultimately understood through the delineation and demarcation of their interactions (see Latour 1993). Stengers (2000), for example, argues that scientific abstraction synthesizes complex phenomena and interactions into easily understood data. She says,

Abstraction is not the product of an 'abstract way of seeing things.' It has nothing psychological or methodological about it. It is relative to the invention of an experimental practice that distinguishes it from one fiction among others while 'creating' a fact that singularizes one class of phenomena among others. This is why the difference between what can be the 'object of representation' and what is supposed to 'escape' representations cannot be grounded a priori by a theory, philosophical or otherwise. To ground always means to refer to a criterion that claims to escape history in order to constitute a norm (Stengers 2000, 85).

The essence of her claim, therefore, is that scientific methods reduce complex human-environment relationships into easily measurable phenomena (Mehta 2005). Applied to water management, this means that hydrological science constitutes one way, and not the only way, of understanding water.

² For the purpose of this chapter, I will simply refer to these processes as representation.

Linton (2010) argues that the hydrological cycle, though a seemingly natural process, is a concept deeply influenced by Cold War politics. American and Soviet scientists disagreed on how to best represent water's biophysical transformation and cycle through the environment. In the end, American scientists prevailed in their depiction of a water cycle that excludes human use and interactions (Linton 2010). The hegemony of this concept forecloses other ways of characterizing or understanding water resources, particularly as they relate to cultural customs or local knowledge (Mehta 2005), and helps underwrite the powerful processes of state building and formation.

In many cases in the global South, colonial and post-colonial officials utilized the scientific methods and models to map, catalogue, and order the social and environmental worlds in pursuit of modernization and development (Scott 1998). Development plans sought to transform how local communities interacted with the environment and subsume their knowledge within state development initiatives. Communities were counted by census measurements and human-environment interactions were converted into resource endowments (Mitchell 2002), creating a social and natural resource base 'legible' to policymakers (Scott 1998). These resource bases were framed through development frameworks. Mitchell (1988) calls this enframing, defined as "a method of dividing up and containing, as in the construction of barracks or the rebuilding of villages, which operates by conjuring up a neutral surface or volume called 'space'" (44). Enframing creates a logical framework for which categorization and quantification take on meaning and informs development planning in cities, water resources, or energy. In his analysis of Colonial British visions for Cairo's urban planning, Mitchell (1988) argues that British planners perceived chaos due to the lack of planning in Egypt's capital city. British

planners were thus able to construct a vision for a “modern Cairo” and implement systematic reordering of the city.

This process of scientifically representing the environment and society for modernization purposes facilitated the development of national and municipal water institutions and services. The researched potential of water resources and large-scale infrastructure projects (Haines 2010; Swyngedouw 2007) facilitated the creation of hydraulic bureaucracies (Molle, Mollinga, and Wester 2009) and state building processes (Meehan 2014). Baker (2005) notes that state building unfolded through state making and state formation processes. State making involves the production of civil society through micro-level negotiations between state agents and local elites, and draws attention to the ways that the relations between state institutions and social groups are negotiated and renegotiated over time. State formation, however, entails the creation of institutions and knowledge that systemize practices that constitute the state’s sanctioned and legitimate authority (Baker 2005). Such processes have taken place in cities through the creation of modern municipal water systems (Meehan 2014; Kaika 2005; Joyce 2003) and in rural areas through the development of irrigation systems and national water distribution systems (Swyngedouw 2014; Birkenholtz 2010; Harris and Alatout 2010; Baker 2005; Gelles 2000; Wittfogel 1981).

The creation of national water sector institutions has entailed detailed and deliberate interventions in rural areas. Early scholarship argued that irrigation-based societies necessarily lead to centralized political authority (Wittfogel 1981) at the expense of irrigation communities that had developed through cultural responses to environmental conditions (Geertz 1972). Others argue that community irrigation practices

are produced and conditioned by a dynamic interaction of local powers, centralized colonial or state authorities, and religious and cultural perceptions and institution (Gelles 2000). For example, Patrick Lansing (1991) revisited an area of Bali where sustainable irrigation systems were collapsing due to water shortages, pests, and disease in rice crops following the introduction of the Green Revolution under Dutch colonialism. He argues that the Dutch mistakenly believed that indigenous royal powers controlled the irrigation systems (Lansing 1991). As such, the Dutch attempted to recreate this royal hydraulic bureaucracy in order to increase tax revenues and justify their colonial control. They did not, however, recognize that water temples, and not royal authorities, linked the irrigation systems to social units. The temple Gods provided symbolic meaning that united farmers in the coordination of their irrigation practices.

Consequently, colonial-era and post-colonial state institutions were not highly successful in transforming rural communities as envisioned in development plans. However, rural communities and environments did come to reflect the influence of local, state, and internationally financed development priorities. In many cases, community governance of irrigation systems evolved with the formation of the state in the form of subsidies, expert support, or infrastructural development (Gelles 2000). For example, agricultural production in Syria significantly increased after government officials adopted modernization plans, which included significant fuel subsidies for expanded irrigation and land reform policies. This revitalized a political economic alliance between the Ba'ath Party authority and the agriculturalist and peasant classes (Barnes 2009; Hinnebusch 1989). A key aspect of this modernization was the scientific mapping of water basins, which bolstered the authority of the Ministry of Irrigation and its

jurisdiction over all water resources in Syria. The maps, however, did not correspond to the biophysical boundaries of watersheds or the historical demarcations of peasant use (Barnes 2009). Over time, this exposed many farmers to precarious conditions as water scarcity increased due to a multi-year drought, declining water table, and a poorly timed reduction in fuel subsidies. Between 2008 and 2010, one year before the Syrian uprisings, several hundred thousand Syrians in the northern agricultural provinces left to urban areas as livelihoods collapsed, leading to greater pressure on urban services and the labor market (De Châtel 2014; Mahayni 2013b).

The example in Syria reflects Mosse's (2003) claim that water's mediations of social relations varies significantly from place to place. These interactions between state policies and institutions, local communities, and environmental dynamics are produced within complex histories of settlement, cultivation patterns, revenue regimes, social structures, and tenancy arrangements, all of which contribute to the present-day forms of collective resource management. In turn, dichotomies of state/society, pre-colonial/colonial, and tradition/modernity need to be reconsidered in light of the ways that local forms of organization, practice, and cultivation are produced through converging, competing, and interweaving relationships between colonial and state administrators and communities (Mosse 2003). For example, Mosse (2003) finds that shifting political systems imprinted irrigation regimes in southern Tamil, India. Each political regime – the warrior state, the Zamindaris under colonialism, and the post-colonial government – ideologically incorporated water tanks and irrigation systems into their representations of rural order. Irrigation collapse or other ecological calamities were blamed on the failure and illegitimacy of previous regimes. Such representations thus

stood in contrast to the reality that the irrigation regimes were inherently unstable and always changing.

The legitimacy of rule over water systems and society has been reinforced through codification of law, administrative codes, and widespread utilization of scientific technology (Mosse 2006). These techniques of representation have also been conducive to the securitization and centralization of state power and institutions. Alatout (2009, 2007) notes that scientific characterizations of water abundance and scarcity were instrumental in encouraging Zionist immigration and securitizing the Israeli state.³ Zionist narratives of abundance in the 1920s and 1930s were based on the results of “new geophysical methods” used to map water resources in Palestine. This enhanced the aura of Zionist authority as a scientifically and technologically advanced institution and legitimized migration to the lands of Palestine (Alatout 2009). By the 1960s, Israeli narratives shifted to water scarcity, which heightened security concerns and empowered the state’s control over and management of water resources and populations (Alatout 2007).

Similarly, state security was a key driver of modernizing Spain’s national water systems (Swyngedouw 2014). In the mid-1800s, liberal intellectuals sought to revive

³ The idea that water scarcity in the Middle East is a foregone conclusion largely originates with increased European involvement in the region. Davis (2011) writes,

With the rise of Anglo-European imperial power in the region, though, in the nineteenth and early twentieth centuries, an environmental imaginary began to be constructed that frequently portrayed the Middle East and North Africa as being on the edge of ecological viability or as degraded landscape facing imminent disaster. Because the local inhabitants were most often blamed for the environmental degradation, by deforestation, overgrazing, or over irrigation, for example, this environmental imaginary allowed the telling of stories, or narratives, that facilitated imperial goals in the name of “improvement” and later, of environmental “protection” (2).

Such depictions, however, were rooted in colonial dreams, in which Europeans could bring order to a region plagued by environmental catastrophe.

Spain's economy after the demise of its colonial empire by addressing the country's uneven distribution of water in order to expand irrigation-based agricultural production (Swyngedouw 1999). Policymakers scientifically defined regional water deficits in order to transfer water from abundant to scarce places through a national hydraulic network (Swyngedouw 2007). Like the Syrian and Israeli experiences, this project, which was realized during Franco's fascist rule, was politically motivated by a desire to eradicate autonomist aspirations (Swyngedouw 2007).

Likewise, officials in Pakistan centralized institutional power through large-scale infrastructure designed to modernize rural water systems (Haines 2010). Local communities in the Sindh region had long relied on a series of canals to manage the fluctuations in the Indus River, but neglect of the canals resulted in silt and sediment buildup (Haines 2010). In an effort to stimulate agricultural production and justify the building of a dam, Pakistani officials borrowed from their former British colonizers to characterize Sindhis as backwards and a barrier to the state's pursuit of progress. This dam ultimately deepened the poverty of the Sindhi communities. This perception of progress was common to many settler colonies as well. Gibbs (2009) argues that contemporary water crises in Australia can be traced to the construction of boreholes and river diversions by British settlers as a way to maximize local development at the expense of indigenous communities. It is, therefore, no accident that ongoing water crises have emerged in Syria, Israel/Palestine, Spain, Pakistan, and Australia. Hydrological science and development programs characterized communities and environments through stable frameworks that were ultimately instrumental for the creation of modern states, albeit at significant social and environmental costs.

These examples reflect the various ways that scientific representations are inherently political or politically deployed in development paradigms. In many states, the water sector emerged as an outcome of deliberate measures by government officials to order and manipulate social groups, the environment, and the interactions between them through their systematic ordering and cataloguing. As several academics highlight, the production of humanitarian, public health, and ecological crises after the implementation of such development programs reflect the ways that the development frameworks based on the representations of society and the environment are limited. In essence, social groups, water systems, and state institutions co-evolve through the deliberate state formation and making processes leading to the continual production of an always uncertain and unstable water sector.

One under acknowledged dimension of these processes is the fact that these state building processes also shape the evolution of municipal water services through political and institutional constraints that ultimately become endemic to national and municipal water sectors. The nature of changes to water sector institutions, communities, and water resources is context dependent. Consequently, attention to the histories of urban water systems and the eras of privatization must attend to the nature of the constraints affecting the ability to realize and reform municipal water services. Understanding how these constraints impact municipal water services, however, requires clarifying how urban water systems have been created and changed over time.

The Creation of Municipal Water Systems, Decline, and the Rise of Privatization

Scholars argue that municipal water systems reflect the dynamic interplay of many factors, including modernist visions, political power, and capitalist influences over urbanization processes (Kooy and Bakker 2008; Gandy 2006; Swyngedouw 2004). The origins of many modern urban water systems, especially in the global South, are intricately tied to European beliefs about hygiene and order (Joyce 2003) as city planners and engineers designed systems to produce, circulate, and metabolize water and its waste (Heynen, Kaika, and Swyngedouw 2006; Swyngedouw 2006; Gandy 2005). Throughout Europe and European colonies, cities came to reflect several layers of technological, social, and environmental systems (Swyngedouw 2006; Gandy 2005). Subterranean water networks and private household connections became the norm following greater understanding of the benefits generated by municipal water and sanitation services (Kaika 2005). The ubiquity of household connections, however, exists in tension with access inequalities to potable water, which surged onto the global agenda in the past twenty years, and has become a key element in the UN's Millennium Development Goals (see UN 2011, UNDP 2006). This tension explains why household connections to formal water networks are characterized as a trait of modern cities whereas slums are described as disorderly and unhygienic (Ranganathan 2010; Coelho 2005).

Though the push to create sanitized cities by treating and circulating drinking water through subterranean networks and removing waste to the periphery is a goal common to most modern cities, it has not been equally applied in urban environments. In fact, one could say that the outcome of this drive was the creation of sanitized neighborhoods, not cities. This produced cities characterized by neighborhoods

connected to urban water services surrounded by areas of disconnection and network deterioration (Bakker 2003c). Unequal urban water networks have emerged in part through a dynamic urban political economy that ultimately regulated access to drinking water and sanitation services (Joyce 2003).

This political economic urbanization is closely tied to colonial and post-colonial modernization initiatives. In many cities of the global South, colonial authorities and later newly independent governments financed the construction of urban water networks and sanitation systems in European and elite neighborhoods but did not attend to the needs of indigenous and low-income communities (McFarlane 2008; Dill and Crow 2014). For example, Gandy (2006) argues that stark access inequalities in Lagos, Nigeria, stem from British policies that prioritized formal water provisions for colonial subdivisions but not for indigenous neighborhoods. Following independence, fiscal deficits and underinvestment led to rapid deterioration of water networks, which reinforced access inequalities. Kooy and Bakker (2008) similarly argue that contemporary fragmentation in Jakarta is rooted in colonial planning decisions that favored Dutch elites and upper middle class interests. The impacts of these colonial preferences have carried into post-colonial eras as the impact of political power and economic influence over municipal water services persisted (Swyngedouw 2004).

The case of Guayaquil, Ecuador exemplifies the influence of political and economic power over urbanization processes. This city is quite water abundant and yet thousands of urban poor do not have access to potable water (Swyngedouw 1997). The reason is that water network expansions were connected to urban development financed by elites in the cocoa, banana, and petrol industries from the late 19th to the late 20th

centuries (Swyngedouw 2004). The political and economic influence of capitalist elites over city planners resulted in the city's uneven urbanization, in which basic services and water networks were only extended to newly built neighborhoods. The end result was that Guayaquil's water networks came to be characterized by pockets of formal connections inter-penetrated by alternative water delivery systems, including water vendors, bottled water, water coops, illegal connections to infrastructures, and direct access to rivers and streams (see also Bakker 2003b). Indeed, non-formal water provisions are common in many cities around the world (Kjellén and McGranahan 2006). In Amman, for example, some neighborhoods rely on a combination of both water trucks and formal water connections in order to meet their daily water needs (Gerlach and Franceys 2009). The prevalence of these non-formal services, furthermore, exposes low-income households to other forms of exclusion, as powerful businesses, mafias, and elites control these water services (Anand 2011; Bakker 2010)

Nevertheless, non-formal access, especially in the eyes of development practitioners and city planners, reflect urban water crises. Rather than attending to the colonial or politically influenced planning decisions, mainstream analysts and experts argue that such unequal access reflects the failure of public sector to manage urban water resources (World Bank 1993). Urban water crises throughout the global South emerged as a key development issue in the 1980s and early 1990s. Led by World Bank, development elites pushed for reforming urban water services in the name of the poor by arguing that governments had failed to adequately value water resources and services and failed to invest in and rehabilitate water sector infrastructure. Additionally, development economists criticized government institutions for bloating their bureaucracies through

public sector employment opportunities, which created inefficient institutions operating at widespread deficits. These claims were part and parcel of a more general push to reregulate state involvement in the economy through which new forms of governance and management practices were introduced and producing variegated outcomes (Brenner, Peck, and Theodore 2010; Brenner, Peck, and Theodore 2010; J. Peck and Theodore 2007; Brenner and Theodore 2002; Jamie Peck and Tickell 2002).

Consequently, development institutions advocated for the de-regulation of the water sector in two ways. First, they called for privatization, private sector participation, or commercialization of public water utilities. Second, they called for market valuation of water resources and demand-management in order to regulate inefficient consumption and finance the rehabilitation and expansion of urban water networks. Since the early 1990s, municipal water services have been privatized in various ways (Budds and McGranahan 2003). Two of the most popular forms are privatization or public-private partnerships and commercialization. Bakker (2003a) defines privatization as “the shift in control from the public to the private sector, through the transfer of ownership or management responsibility for water supply infrastructure” (38) whereas commercialization entails “changes in resource management practices that introduce commercial principles (such as efficiency), methods (such as cost-benefit assessment), and objectives (such as profit maximization)” into water governance (Bakker 2005, 544). The experiences and outcomes of water sector privatization experiments have not been straightforward as state institutions, development organizations, and municipalities negotiated different types of arrangements (Bakker 2003a).

State institutions have been key partners in the privatization of municipal water services (Bakker 2002). In particular, governments are often incentivized to create private sector friendly laws that facilitate the incorporation of private sector participants or commercialization of water utilities in exchange for financial support (Swyngedouw 2005). Reregulation of water sectors has succeeded in strong regulatory environments (Smith and Hanson 2003; Freire and Stren 2001; Klein 1996). Most privatization reforms, however, are often negotiated within elite circles with little understanding of context (Goldman 2007) and implemented in places with weak public sectors and little power to negotiate more favorable agreements (Smith 2004). The results of such reforms have undermined equal access to water (Bakker 2003a) and reconfigured inner city, peri-urban, and rural water governance to the detriment of poor communities (Budds 2009; Perreault 2005; Budds 2004).

In Spain, for example, authorities adopted market-based management in order to mitigate the hydrological and financial crises created by state-led development initiatives of early and mid-20th century resulted in higher prices for farmers (Bakker 2002). Similarly, in Chile, government officials revised the national water law in 1981 around the principle of private property rights in conjunction with widespread implementation of economic deregulation and privatization initiatives (Budds 2004). Though the water law has since been revised, the principle of private property has remained, creating a long term effect of wealthy landowners and farmers consolidating ownership over surface and groundwater resources, leading to rapidly deteriorating water supplies (Budds 2009). In other cases, state water institutions have become targets of commercialization and privatization initiatives. For example, in South Africa, a bulk water supplier owned by the

state was commercialized to sell water to municipal utilities at market rates in order to reduce its capital deficits. This resulted in higher costs for urban water consumers as municipal water utilities increased prices to cover the higher cost of bulk water supplies (Loftus 2006a).

Indeed, local context is critical for determining the success or failure of privatization initiatives. Protests and resistance measures against privatization have become common throughout the global South, the most famous of which is the Cochabamba Water War in 2002. Protesters shut down the city in a violent standoff with government troops after the Bolivian government negotiated the full privatization of Cochabamba's water utility with Bechtel Corporation, leading to severe increases in water price (Shiva 2002). Similarly, protesters in Cape Town challenged higher prices resulting from tariff reforms and disconnection policies for failure to pay water bills. The tariff reforms, however, assumed households had equal capacity to pay and consequently the disconnections disproportionately affected poor, primarily black communities, an enduring legacy of apartheid inequalities (Smith and Hanson 2003). Increased water prices, however, are not the only outcome of privatization measures as technical interventions at the household level have accompanied privatization reforms.

Direct neighborhood and household interventions designed to reinforce or support privatization initiatives have also become widespread. For example, in the Soweto Township in Johannesburg, South Africa policymakers recommended the installation of pre-paid water meters and granting 6,000 liters for free to low income families alongside network rehabilitation in order to reduce financial deficits (von Schnitzler 2008). In exchange for pre-paid meters, outstanding household bills were forgiven on the condition

that they did not tamper with meters. Any water use in excess of the free water allocation required advance purchases by households, which would be recorded on a magnetic chip and read by the meter (von Schnitzler 2008). Similarly, water officials in Durban, South Africa introduced free allocations in exchange for the installation of flow-regulating meters at each household. These meters were considered to be an upgrade as households were previously required to visit local water kiosks in order to purchase water (Loftus 2006b). The new meters and lifeline deliveries were intended to help households budget their water consumption while keeping prices low.

The stark urban inequalities in South African cities were compounded by the lack of democratic accountability in such policy measures (Smith 2004). These interventions invoked urban consumers as market participants and shifted capital and operational costs to consumers through increased prices with little public input. These processes accentuated inequalities as higher prices were often unaffordable for poor urban residents and reduced autonomy over water use (Bakker 2010; McDonald and Ruiters 2005; Swyngedouw 2005; Bakker 2003; Shiva 2002). Many households on the receiving end of such direct interventions opted out of these programs through non-payment or pursuing alternative forms of water access (Bakker et al. 2008), in part because they claimed to receive less water after the interventions. Common reasons cited were water leaks and meter malfunctions that led governments to prematurely cut a consumer's water supplies (Loftus 2006b; Bond 2003). More critically, such initiatives dispossessed urban households of their autonomy over water access and use as the pre-paid meters automated policing and enforcement in municipal water services (von Schnitzler 2008).

Ultimately, privatization and corporatization reforms have failed to realize their expected outcomes and have disproportionately affected low-income households. In many cases reforms prioritized profit over equity (Bakker 2000), which increased the likelihood of corruption in places with weak institutions (Smith and Hanson 2003) and reduced public accountability (Bakker 2010; Smith 2004). The combination of these factors interacted with a failure to understand dynamics of household access and consumption, leading to highly unequal municipal water systems (von Schnitzler 2008; Loftus 2006b; Bond 2003). The failures of privatization programs, however, are not evidence that public sector management regimes are better. The modernization and privatization eras differ in their economic and institutional priorities (Swyngedouw 2005), but research has not sufficiently examined how political and institutional contexts shape water management services.

Perhaps the most important institution shaping these contexts in both the modernization and privatization eras is the World Bank, which has financed development and reform projects throughout the global South (Bakker 2013). One way of assessing the context-dependent institutional environments produced by the interactions of World Bank and government priorities is through Bakker's (2010) reassessment of governance. Her contribution to the governance debates focuses on market-based management (see Bakker 2010; Bakker et al. 2008). One of the limitations of scholarly research about privatization programs, even when adopting a critical governance approach, is that they do not attend to the links between the past and the present. Contemporary crises in municipal and national water services and the dynamics and outcomes of privatization are strongly influenced by politically driven state building processes underlying public sector

management regimes. In other words, the outcomes of privatization programs cannot be disassociated from public sector management regimes or their failures.

Consequently, institutional contexts must be historicized in order to understand how politically driven state building programs produced endemic and continuously evolving constraints to water sector operations. Building on Bakker's (2010) argument, this dissertation examines the ways that past and contemporary urban water crises are represented and addressed in mainstream circles and explores the relationship between the challenges afflicting past development projects and current privatization programs. The claim of this dissertation is that the dynamics of state building programs and evolution of municipal water services produced institutional and political constraints that today shape the dynamics of privatization initiatives. The failure to understand these relationships explains how and why households in different socio-economic conditions are differentially impacted. Mainstream characterizations tend to treat many of the institutional constraints as symptoms of the public sector's failures while the political constraints are seen as exogenous shocks to water sectors. Instead, the institutional and political constraints should be seen as part and parcel of the water sector's operational system. Failure to understand the production of institutional and political constraints and their evolution over time can lead to mischaracterizing why policy reforms, such as privatization, have not met their intended goals.

The case of Jordan suggests that Amman's water management crises and privatization dynamics are deeply tied to Jordan's state building and formation processes. The corporate restructuring programs, starting in 1999, have been strongly influenced by the institutional and political constraints produced through past development projects and

state building efforts. Privatization programs not met their intended goals. They have, however, generated new challenges and constraints to the municipal and national water sectors. As such, it is important to examine how these constraints are represented in mainstream circles and critically analyze how these constraints were initially produced and evolved over time. Further, understanding this deeper historical context will shed light on how households perceive and experience the corporate restructuring programs under way. As such, it is important to undertake a critical analysis of how the formation of state water sector institutions and the negotiation and implementation of privatization are linked by constraints inherent to and embedded in Jordan's water sector dynamics.

A Note on Methods

Several methods are utilized in this research. First, using content analysis, World Bank, USAID, and governmental proposals and project completion reports, in addition to mainstream academic articles, government reports, and news articles were analyzed in order to deduce and synthesize the emergence and evolution of the institutional and political constraints affecting the water sector over the course of five decades. Second, key-informant interviews were conducted with public and private sector officials working in the water sector in order understand their opinions and dynamics of their work and challenges they face. Third, extended household interviews and Exploratory Spatial Data Analysis (ESDA), a type of geographic information science, were conducted to assess the factors shaping household experiences with respect to access and consumption. The ESDA provided a statistical evaluation for water consumption and billing trends for urban consumers registered with Amman's water utility, Jordan Water Company

Miyahuna, in 2003, 2007, and 2011. Household interviews addressed experiences with privatized municipal water services operating an intermittent distribution system and changing state/society relationships in an era of subsidy reductions and changing forms of governance. The household respondents varied by geography, socio-economic status, gender, and citizenship status in the goal of capturing a general snapshot of societal perspectives in Amman.

As an Arabic-speaking expatriate living in Amman, I conducted interviews in Arabic. All interviews were recorded with permission and transcribed into English. Officials in the public and private sector were contacted through networking facilitated by local contacts and referrals from interview participants. Households were accessed through my social networks at a non-formal school for host and refugee communities in east Amman where I volunteered as an English instructor and through my own contacts, including local grocers, colleagues, my landlord, and neighbors.

Objective and Structure of the Dissertation

The overall goal of the dissertation is to analyze the production, evolution, and impacts of institutional and political constraints on municipal and national water services in Jordan. Through the course of this research, several key claims are developed. First, the case for corporatization and privatization is strongly built on the representation of water sector crises through narrow engineering and economic frameworks in ways that depoliticize the portrayal of water management crises. Such representation mischaracterizes regulatory landscapes, particularly the evolving interaction between institutional and political constraints and operational processes. Second, these

contemporary water sector crises that corporatization seeks to address are rooted in the history of water sector development and state building processes, on the one hand, and the imbricated evolution municipal and national water policies and institutions. In other words, these processes have resulted in political and institutional constraints that have become part and parcel of the water sector's operational dynamics and continued transformation. Third, the privatization and corporatization reforms are strongly shaped by the ongoing and ever-changing institutional and operational dynamics at the municipal and national level. Such reforms also introduce new constraints to water sector services. Fourth, reform programs fail to consider how the design of municipal water services shape household experiences and the production of access inequalities, which also shape public opinion of reform and affect the likelihood of political contentious reform processes.

The dissertation is divided into six chapters, including the introduction. Chapter Two synthesizes the mainstream debates on Jordan's water management crises, provides a critical re-reading of these themes, and discusses why a more careful framing of the water management crisis is necessary. Chapter Three builds on this re-evaluation of mainstream framing by examining how Jordan's political and economic contexts, particularly regime security and donor conditions, crucially shaped the formation of institutional capacity and operations within the water sector between the early 1960s until the 1990s. Chapter Four examines how these institutional and political contexts have shaped the dynamics of privatization and corporatization starting in 1999 until today. Chapter Five examines household experiences with municipal water services in an era of corporatization, particularly the creation and reinforcement of access and socio-economic

inequalities through the design of the intermittent distribution system. Chapter Six concludes the dissertation with a brief summary of the claims and research contributions to the debates on urban water governance and state and development literatures.

Chapter 2 Representing Water Crises

Introduction

Justification for privatization of municipal water services and the introduction of demand management throughout the global South draws extensively on public sector failures and deteriorating environmental conditions (Bakker 2010; Swyngedouw 2005).⁴ Mainstream characterizations of these crises, they argue, are portrayed through economic and engineering frameworks, with hydrological science playing a key role in advocacy of privatization (Linton 2010). These characterizations, however, are based on a collective “amnesia” on the successes of the public-sector development programs, particularly in developing and extending water services at low costs to consumers. Consequently, political economists argue that water sector crises intensified after structural adjustment programs were introduced at the behest of international donors (Swyngedouw 2005; McDonald and Ruiters 2005). Though there is extensive research on how privatization programs came to dominate water sector development and to what effect (Bakker 2010), there has been limited research into the frameworks utilized by mainstream experts in the push for privatization.

This research is necessary for explaining why privatization and demand management persist despite their poor record and helps shed further light on why such reforms continue to fail. Critical scholars argue that representing social and environmental processes through engineering or economic frameworks (Linton 2010; Stengers 2000; Scott 1998; Mitchell 1988) depoliticize inherently political development

⁴ For the sake of simplicity, this chapter refers to privatization generally, and thus includes outright privatization, commercialization, corporatization, public-private partnerships, management contracts, and other regulatory mechanisms designed to shift public institutions towards private sector logics.

processes and goals (Alatout 2009; Barnes 2009; Alatout 2007). Critiques of privatization do address how reform advocates frame public sector failures, which contextualizes why privatization programs are implemented and to what effect. Their engagement can be further elaborated by examining the particular ways that mainstream analysts build the case for corporatization, and in turn, what they miss. As such, this chapter builds on the contributions of research on representation and development to better understand how privatization programs are framed as necessary for reforming municipal and national water services.

Using the case of Jordan, this chapter argues that mainstream characterizations of its water management crises and the justification for corporate restructuring draw on economic and engineering frameworks in ways that obscure the underlying constraints producing Jordan's water management crises. In particular, three themes are commonly highlighted in the recommendations for corporatizing Jordan's water sector and mainstream research developed by Jordanian institutions, international organizations, and academics. First, there is a mismatch between Jordan's scarce water supplies and rapidly increasing demand, and consequently the public sector model predicated on providing cheap water to urban households is no longer sustainable. Second, institutional overlap and mismanagement have delayed necessary reforms and rehabilitation to infrastructure. The third point is that the rising operational costs and large deficits threaten the viability and fiscal solvency of the water sector. This chapter reexamines these themes through a discussion of the ways that institutional and political constraints underlie Jordan's municipal and national water management crises. The goal is not to provide a descriptive

context for the research on privatization in Jordan, but rather to articulate how it is that mainstream analysts frame the water crises and what their framing ignores.

The chapter is divided into two sections. First, it reviews mainstream analyses and representations of water supply and demand, institutional overlap and mismanagement, and water costs and deficit concerns. Part two demonstrates the limitations of this way of framing the water crisis by explaining how these crises are outcomes of the institutional and political constraints affecting municipal and national water management. The chapter concludes by summarizing the argument and revisits the scholarly contribution.

Mainstream Representations of Jordan's Water Crises

Jordan's ranking among the ten most water scarce countries in the world (UNESCO 2012b; USAID 2011) anchors mainstream characterization of its water management crises. Three main issues underlie Jordan's perilous ranking and represent the key facets of the justification for corporate restructuring. First, Jordan faces a severe mismatch between domestic water supplies and rapidly growing demand, thus leading to calls for more widespread adoption of soft path solutions. Second, Jordan's water sector institutions are plagued by mismanagement and institutional overlap, which delay timely responses to the water crises. Third, the water sector suffers from an inability to cover rising costs and payoff financial deficits, thereby threaten sector's long-term viability. Officials therefore claim that corporate restructuring can solve these three problems by integrating and consolidating market-based management at the national and municipal levels.

Supply and Demand

There is widespread worry about Jordan's supply and demand mismatch. Jordan lacks sufficient access to surface waters, especially since most rivers originate outside the country. Jordanian authorities have been forced to engage in politically fraught negotiations over access to the Jordan River and its tributary, the Yarmouk River, as both Syria and Israel confront their own domestic challenges. Map 2.1 depicts Jordan's twelve administrative governorates and its neighbors.

Map 2.1 Administrative Map of Jordan



Map Produced by Basil Mahayni

The Jordan River's second major tributary, the Zarqa River, was once a key water source for Amman but is now considered unusable for household consumption due to heavy

pollution from industrial activity, poor wastewater treatment, and agricultural runoff (Hussein, Abu Sharar, and Battikhi 2005). Additionally, groundwater resources, which experts place at 90 million cubic meters (Khaleq and Dziegielewski 2006), have been exploited at unsustainable rates in order to meet agricultural, industrial, and municipal demand, leading to widespread deterioration and contamination of supplies (Abu-Sharar and Battikhi 2002).

Growing demand further threaten water supplies (Haddadin 2006). The World Bank (2001) reported that “Despite ongoing projects and plans to mobilize additional water resources, current projections of water balance are that the neck-and-neck race between supply and requirements will continue” (1). Some analysts argued that the mismatch between supply and demand would create chronic water shortages in Jordan by 2010 (Alkhaddar, Sheehy, and Al-Ansari 2005). Others believe that by 2020 Jordan will not be able to meet municipal, industrial, and agricultural demand (USAID 2007). The rapid increase of Syrian refugees since 2011 accentuates fears about the supply and demand mismatch. Hazem al-Nasser, the current Minister of Water and Irrigation, stressed “We live in a chronic water problem, and we are now at the edge of moving from a chronic water problem into a water crisis” (Whitman 2013).

Refugee resettlement in Jordan has been a principal driver of increasing water demand since the late-1940s, making Amman one of the fastest growing cities in the world.⁵ Amman was a small town until Emir Abdullah I selected it as the seat of

⁵ Modern urban settlement in Amman population began with the arrival of Circassian communities fleeing Russian persecution in the late 1800s and early 1900s (Hanania 2011). The construction of the Hijaz Railroad in 1902 intensified settlement activity as Amman became a key node between the region’s major urban centers and Mecca (Hanania 2011; Potter et al. 2007). By 1921, following securing British support for his rule over the Trans-Jordan Mandate, Emir Abdullah I selected Amman as the seat of government

government for the Trans-Jordan Mandate in 1921 (Tell 2013). Amman's transformation into an administrative and economic hub (Potter et al. 2007) attracted migrants from Syria, Palestine, Lebanon, Iraq, and other parts of Jordan pursuing new public-sector job opportunities (Potter et al. 2009; Potter et al. 2007). Between 1921 and 1947, Amman grew from 5,000 residents (Pavanello and Haysom 2012) to 60,000 just before the Arab/Israeli war (Pavanello and Haysom 2012). Since 1948, Jordan received several hundred thousand more refugees in sudden bursts in 1948, 1967, 1991, 2005, and 2011.⁶ This affected planning projections and scenarios⁷, especially in Amman.⁸

Jordan's rapid population growth shaped planning scenarios in the water sector.

The National Water Master Plan (NWMP) (MWI 2004) provides the basis for sector

(Tell 2013) and in turn transformed Amman into the administrative and economic hub of the Mandate (Potter et al. 2007).⁵ Amman attracted migrants from Syria, Palestine, Lebanon and newly independent Iraq, while domestic migrants relocated for new public-sector job opportunities (Potter et al. 2009; Potter et al. 2007).

⁶ In 1948, several hundred thousand Palestinians resettled in refugee camps throughout Jordan, including al-Wehdat and al-Hussein in Amman, increasing the population to 200,000 by 1961 (IDA 1961b). The 1967 "Six Day War" produced a second wave of Palestinian refugees, increasing Amman's population to 500,000 (Potter et al. 2009). Amman continued to grow throughout the 1970s, with 521,000 people in 1971 (Al-Khafaji et al. 1973) and 777,855 people in 1979 (Potter et al. 2009). Population growth stabilized throughout the 1980s until nearly 300,000 Palestinians and Jordanians returned after the Iraqi invasion of Kuwait in 1991 (USAID 2007). In the last ten years, Jordan's population increased by nearly two million with Iraqi and Syrian refugees resettling in Jordan.

⁷ In the early 1960s, the Greater Amman Municipality drew up a 25-year master plan in response to the rapid population growth. The plan's projected population of 360,000 by 1972 (IDA 1961b) yet uncertainty due to ongoing regional crises plagued their projections. Jordan also hosts significant numbers of migrant workers, particularly Egyptians, and its own population has experienced longer lives and maintained high birth rates (Dougherty 2006). Jordan's population growth has been high, estimated at 3 percent annually (Salman, Al-Karablieh, and Haddadin 2008; MWI 2004), with Amman experiencing some of the most rapid rates of growth due to rural-to-urban migration and refugee resettlement (Hanania 2011).

⁸ One particular impact is the expansion of Amman's urban extent from a mere 2.5 square kilometers in 1947 (Potter et al. 2007) to 250 square kilometers by 2009 (Makhamreha and Almanasyeha 2011).⁸ Strong division between poorer eastern and wealthier western parts of the city developed as Jordanians and Palestinians sent remittances from Gulf in the 1970s and 1980s (Potter et al. 2009) and invested in significant urban development projects in west Amman (Al Rawashdeh and Saleh 2006). Similar investments in large-scale development projects by Gulf and Jordanian elites and wealthy Iraqis fleeing the war from the late 1990s to the mid 2000s (Parker 2009) accentuated the divisions. Today, west Amman is wealthier and has lower population densities, with only 2,500 to 6,000 people per square kilometer whereas east Amman is much more densely populated, varying from 14,000 to 30,000 inhabitants per square kilometer (Potter et al. 2007).

planning and budgeting (Policymaker Six 2013). A central goal of the NWMP is to ensure adequate water supplies per capita, which declined from 3600 cubic meters in 1946 to 160 cubic meters per capita by 2004 (MWI 2004). Jordan's current water supply per capita places it in the "severe water scarcity" category according to the Water Scarcity Index (Falkenmark 1989), a fact referenced in several policy papers outlining corporate restructuring plans (USAID 2011; USAID 2010).

Per capita supplies are likely to continue their decline due to population growth from high birth rates, improved health services, and refugee resettlement. Currently, Jordan's renewable water availability is below 130 cubic meters per person per year (Humpal et al. 2012), with a total of 850 million cubic meters of available water (Khaleq 2008). Experts have offered a variety of forecasts for future water availability and demand. One analyst estimates that total available water resources will increase to 1,289 million cubic meters by 2020 (Khaleq 2008) whereas the National Water Master Plan projects that total renewable supplies will not be more than 1,150 million cubic meters by 2020 (MWI 2004). Another expert estimates that water availability will fall to 90 cubic meters per person by 2025 (Humpal et al. 2012). Demand forecasts, in contrast, is range from 1,616 million cubic meters by 2020 (MWI 2004) to 1,685 million cubic meters by 2020 (Khaleq 2008). As such, by 2020, Jordan will face an annual water deficit of 396 to 466 million cubic meters.⁹

Because of the large gap between supply and demand, advocates of corporate restructuring also propose increases in water supply production capacity. First, they argue that alternative sources of water supply must be developed in lieu of continued diversion

⁹ The water availability and demand forecasts published by the MWI (2004) and Khaleq (2008) include requirements for the municipal, industrial, tourism, and agricultural sectors.

of surface water resources. They also call for increasing Jordan's capacity for wastewater treatment from 34 million cubic meters per capita in 2005 to 101 million cubic meters by 2020 (MWI 2004). Plans call for diverting treated wastewater into dammed reservoirs, which will alleviate demand for surface water resources. Increasing the production capacity will require an increase in the number of treatment plants from 28 to 36 – a costly endeavor requiring significant levels of investment in infrastructure in addition to increased operational costs (MWI 2004).

Second, the plan calls for reducing groundwater extraction to safe yields by 2020. This will require effective regulation and application of several groundwater laws (MWI 2004) which to date has been unsatisfactory (Humpal et al. 2012). Third, the plan proposes significant increases in desalination, water importation, and cloud seeding. The plan also recommends adopting new irrigation technology and restrictions on agricultural production (MWI 2004). The principal rationale for this is that the contribution of agricultural production to economic growth declined from 14.4 percent in 1972 to 3.5 percent in 2002 (MWI 2004).

Authorities also call for widespread adoption of demand management programs alongside adjustments in water use and development of new supplies. In 1997, the Ministry of Water and Irrigation created a National Water Demand Management Strategy for water utilities, irrigation, wastewater and groundwater management (MWI 1997). Two years later, USAID and the MWI launched the Water Efficiency and Public Information for Action (WEPIA) project to promote water conservation among urban households (Albani, Soer, and Tarawneh 2011), and in 2002, the Ministry established a Water Demand Management Unit (WDMU). A core part of the WDMU's mission is the

promotion of water efficiency and conservation policies, and public awareness programs (Khaleq 2008). From 2002 until 2007, the WDMU conducted public awareness campaigns to address water conservation in tourist venues, utilities, and households but they did not participate in demand management policy formulation or implementation.

In 2007, USAID and the MWI launched the IDARA¹⁰ demand management strategy for Jordan's municipal water services. IDARA had two key objectives: 1) build capacity in the WDMU and 2) establish a Water Demand Management System that oversees household water use and savings (Albani, Soer, and Tarawneh 2011). The overall purpose of the IDARA project was to create a mechanism for updating the National Water Master Plan's forecast models used in planning, management, and conservation strategies in municipal water services. WAJ's operations directorate and the water utilities were expected to provide information about water sales and consumption trends to the Ministry for the updates to the NWMP.

The benefits of producing new supplies and the implementation of demand management through the WEPIA and IDARA projects are being united under a wholesale structural transformation of Jordan's water sector through corporate restructuring of the municipal and national water sectors. The ISSP is implementing the corporate restructuring reforms through a transformation of institutional responsibilities at all levels of the water sector. The reason for this is that Jordan's water sector is plagued by inefficiencies and unclear responsibilities between the MWI, WAJ, and municipal water utilities. Officials in the different institutions fail to cooperate due to excessive and overlapping responsibilities, leading to decision-making delays that project progress and

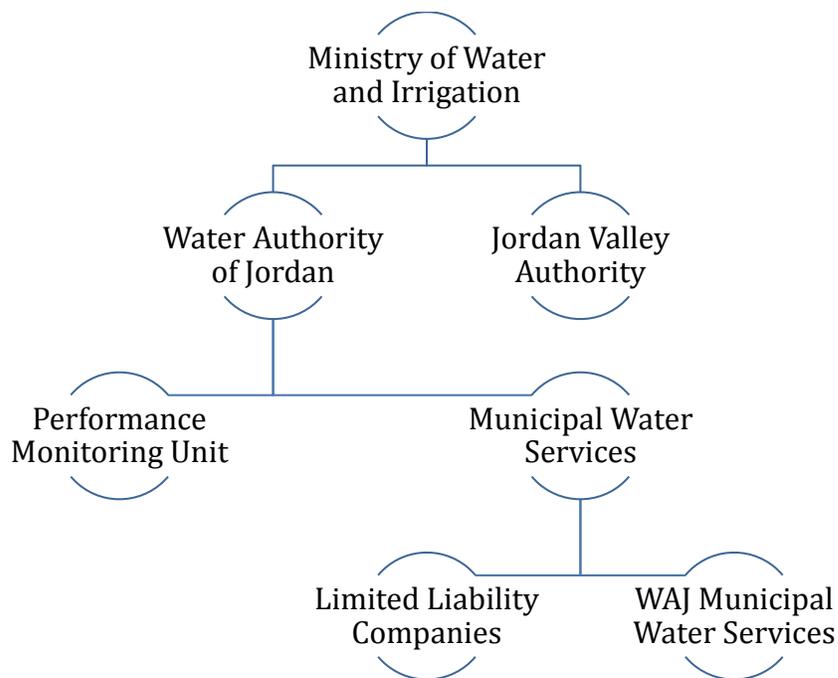
¹⁰ IDARA is an Arabic term for management.

timely responses. The ISSP seeks to improve collaboration between water institutions at the national and municipal scales to create a more sustainable management system built on the foundations of corporate efficiency and effectiveness.

Institutional Overlap and Mismanagement

Jordan's national and municipal water services are characterized by the lack of clearly defined roles and institutional overlap and the water sector's incomplete corporatization. In particular, the national and municipal institutions do not have powerful incentives and mechanisms that lead to better and more efficient performance, which undermines both transparency in policymaking and implementation and effective water allocation plans (Humpal et al. 2012). Figure 2.1 depicts the current institutional arrangement of the water sector:

Figure 2.1 Jordan's Water Sector Institutions



Source: Basil R. Mahayni

Prior to the implementation of the ISSP, the Ministry of Water and Irrigation was responsible for devising development goals and plans for Jordan's water sector. In the second tier of management, the Jordan Valley Authority was responsible for bulk water production and allocations in the Jordan Valley. The Water Authority of Jordan, on the other hand, divided its responsibilities between production of bulk water supplies, direct operations in municipal areas, and oversight of limited liability companies. The limited liability companies, which are state-owned enterprises wholly owned by WAJ, are currently operating in Aqaba, Amman, and the north of Jordan. The Performance Monitoring Unit is a sub-unit within WAJ, which monitors, but does not regulate, the operational performance of the limited liability companies. The reality of this institutional arrangement, however, is one of overlapping responsibilities and fragmentation of decision-making processes and institutional cooperation (Hagan 2008).

The main concern for advocates of corporate restructuring is the water sector's incomplete corporatization (USAID 2011). Privatization initiatives have been launched in Amman, Aqaba, and northern Jordan. In 1999, the MWI agreed to implement a private sector management contract in Amman and in 2007 created a Jordan Water Company – Miyahuna to oversee Amman's municipal water services. Limited liability companies were also created in Aqaba and northern Jordan in 2004 and 2011 respectively. These limited liability companies, however, are wholly owned by WAJ, which also regulates and sells bulk water supplies to the companies. This inherently creates a conflict of interest, thereby subjecting the companies to significant influence by WAJ and constrains the autonomy of the three companies (Humpal et al. 2012).

WAJ plays an important role as a flagship institution in the water sector. It is characterized as an overly bureaucratized system that is slow to respond to water crises and ineffectively coordinates with other water sector institutions. WAJ became a political intermediary for Jordanian authorities using public sector employment to diffuse simmering tensions between Jordanians and Palestinians. The institution is also plagued by a rigid civil service law that prevents termination of public-sector employees for non-performance (Hagen 2008).¹¹ Over time, this inflexibility and over-bureaucratization diminished WAJ's operational capacity. In 1996 and 2007 the Canadian International Development Agency (CIDA) and the Jordanian Ministry of Public Reform recommended delegating WAJ's management and policy responsibilities to the Ministry of Water and Irrigation and decentralizing municipal services (Hagen 2008).

This recommendation, however, was offset by political expediency. The current law inadequately defines institutional responsibilities and disregards the reality of how the water sector operates (MWI 2004). Under the current water law, WAJ is legally institutionalized through a law and the Ministry through a by-law. This means that the MWI technically reports to WAJ despite the fact that the MWI is responsible for the whole water sector (Policymaker Eleven 2013). This has fostered a dynamic in which ministers rely on their political influence to shape water sector recommendations. For example, the recommendation made by CIDA to shift WAJ's management responsibilities to the MWI and decentralize municipal water services was reversed by a

¹¹ This has been a key target in the reform of the water sector and one of the principal reasons for the private management contract for Amman's municipal water services in 1999. After LEMA assumed managerial control of Amman's water services, it gained the right to hire WAJ employees at private sector rates, with the remaining employees were reassigned to different positions within WAJ (Abu-Shams and Rabadi 2003). This initiated a preliminary differentiation between public and private sector employees within the water sector, with the latter receiving higher wages than WAJ, JVA, and MWI officials.

newly appointed MWI minister despite governmental approval (Hagan 2008). There has been a strong tendency for ministers to express significant influence over the direction of the water sector (Policymaker Twelve 2013). A former Minister of Water and Irrigation noted that minister involvement in the day-to-day affairs of the water sector undermines long-term planning in the water sector, stating,

... because of the interference of the newcomers, of the new ministers, “no I don't want this project I want that project”...it's not systematic. If it is institutionally well structured, the minister would come only just to manage. You know maybe he will be more of a politician rather than a technocrat. He would work on future plans rather than interfering what is on the table (Policymaker Fourteen 2013).

Some ministers are hands-off in their approach to leadership whereas others engage themselves in day-to-day tasks of the MWI and WAJ, and, in some cases, at the level of the limited liability companies (Policymaker Six 2013). Similarly, the Council of Ministers affect long-term water management plans and strategies as they hold ultimate veto power over key issues, including tariff reforms and water law revisions (Humpal et al. 2012).

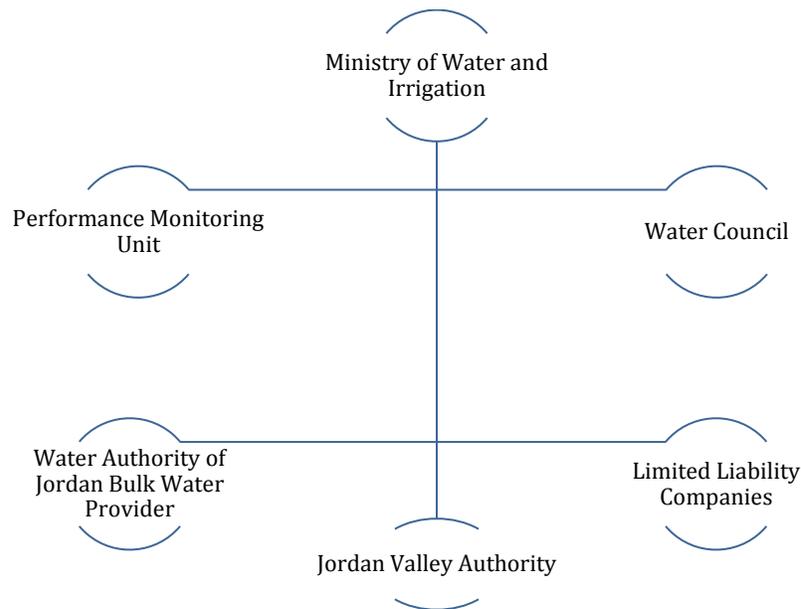
The lack of a strong legal code limits the MWI's capacity to enforce cooperation. This affects critical programs, such as the demand management programs. For example, the Water Demand Management Unit must receive billing and demand projections from WAJ-operated municipal water services in order to adequately inform MWI plans and strategies. WAJ, however, rarely cooperates with such requests because it is not legally required to do so. Similarly, the IDARA project, which was implemented between 2007 and 2012, was hailed as a success for improving demand management and enhancing institutional capacity within the Ministry (Albani, Soer, and Tarawneh 2011). Despite this progress, WDMU officials argue that USAID participation was necessary for the

project's progress. After USAID closed the project, the WDMU's capacity to advocate for demand management diminished because it could not compel the limited liability companies, wholly owned by WAJ, from providing it with the necessary data to update forecast models (Policymaker Eleven 2013). The reason is because the WDMU cannot require WAJ to enforce the cooperation of limited liability companies in the sharing of information. As such, the calls for integrated water management plans as detailed in the National Water Master Plan (MWI 2004) and the Water for Life Strategy report (MWI 2009) are left unfulfilled.

The ISSP seeks to mitigate these issues through a legally enshrined corporate framework based on revised institutional responsibilities. Figure 2.2 depicts the changes being implemented as part of the ISSP. Under the ISSP, the water sector will be governed through a corporate framework. This entails several revisions to institutional jurisdictions and channeling decision-making process through appropriate frameworks. Central to this framework is new water law and the institutionalization of the PMU as a water sector regulator anchoring the corporate restructuring program. The PMU will be moved from WAJ to the MWI and will be legally empowered to monitor and regulate WAJ and the limited liability companies based on key performance indicators. It will also have the authority to make recommendations on tariffs and other related issues subject to strong political influence. The Ministry of Water and Irrigation will continue to oversee the water sector as a whole, but the minister's influence will be severely constrained. Rather, the minister will be required to participate in broader stakeholder debates about water policy in a Water Council forum for interest groups and stakeholders to debate and provide recommendations to the PMU and the Ministry of Water and Irrigation

(Policymaker Four 2012). The PMU, in turn, will track these policy debates as a legally protected institution empowered with the authority to make final recommendations on water management contracts, sector allocations, and prices (Policymaker Four 2012). The biggest change will be in the revision of WAJ’s responsibilities, and ultimately its influence over the water sector. WAJ’s operational scope will be severely curtailed to bulk water supply production. WAJ-operated municipal water services, furthermore, will be converted into limited liability companies.

Figure 2.2 Proposed Changes to Jordan’s Water Sector Institutions



Source: Basil R. Mahayni

The ISSP’s proposed institutional transformation intends to mitigate mismanagement and overlapping responsibilities through wholesale corporate restructuring. Institutional responsibilities are in the process of being revised so that corporatization is scaled up from the municipal to the national scales. Authorities are

working to protect this framework by legally institutionalizing these reforms, particularly the significant power granted to the PMU. As such, analysts believe that the water sector will overall become healthier through more efficient and effective management practices and frameworks. This benefit will be especially acute in the water sector's finances.

Water Costs and Financial Deficit Concerns

Debt financing and state subsidies have ensured the water sector's fiscal solvency in the short-term, but the sector's financial outlook is dire. Current cost recovery trends barely cover operating costs, delaying necessary investments in capital rehabilitation. The National Water Master Plan outlines this burden,

The annual subsidies to WAJ and JVA amount to about 60 million JD, three quarters of which are "swallowed" by WAJ. Out of this amount, 15 million JD are interest payments on external loans contracted for investments in hydraulic infrastructure. In addition, there are indirect energy subsidies given to farmers reaching a sum of 4 million JD annually. Only 50% of the total cost (O&M + depreciation + interest payments) of water sector operations are covered from tariffs and related fees (MWI 2004, 88).

The combination of interest payments on loans, poor cost recovery, higher operating costs, and limited investment in infrastructure has undermined demand management programs. Extensive donor support and subsidization from the Ministry of Finance, which is responsible for managing loans, grants and other forms of financial assistance given to the water sector, has been necessary to keep the water sector solvent. Currently, WAJ and the Ministry of Finance divide responsibilities for interest repayment on international and public bonds that are used to finance major infrastructural projects.

WAJ's inability to generate enough revenue to cover direct operating costs has restricted its capacity to repay loans and interest charges. In 1999, the Ministry of Finance indirectly subsidized WAJ by cancelling forty years of accrued debt. Since the

cancellation, WAJ's debt has risen at an alarming rate, reaching 0.7 billion Jordanian Dinars in 2010, and is expected to reach 1.9 billion Jordanian Dinars by 2016 (Sommaripa 2011).¹² Current revenue streams cover only 60 to 70 percent of capital expenditures and operating costs (Sommaripa 2011). This requires extensive financial support from the Jordanian government, which is already mired in debts (Humpal et al. 2012). In 2010, the net deficit of the water sector was equal to 20 percent of the combined deficits of ministries, departments, and other government units (Sommaripa 2011), forcing the government to spend between 5 and 18 percent of the national budget on the water sector (USAID 2011).

One reason for the cost recovery problem is the sector's failure to address the sources of revenue loss. Jordan faces persistently high rates of non-revenue water (NRW) loss, which is water distributed in the network but not billed due to water leaks in the network or theft. It is estimated that nearly half of WAJ's potential revenues are lost to water leaks and theft (MWI 2004). Overall, the total estimated annual NRW for the three limited liability companies are 80 million cubic meters per year. Miyahuna averages around 50 million cubic meters lost annually, or around 40 to 50 percent of the circulating water (Humpal et al. 2012). This is alarmingly high considering that households only receive water 24 to 48 hours each week.

Increasing water supplies in Amman's intermittent distribution system can compound the crisis. For example, the Disi Conveyance Project is a major water transfer initiative completed in summer 2013.¹³ The project is supposed to increase Amman's

¹² One Jordanian Dinar is equivalent to \$1.41.

¹³ In the mid-2000s, a capital enhancement project was implemented to improve the state of the water networks in Amman. It converted the network into a gravity-based pumping and intermittent distribution

bulk water supplies for daily distribution to the whole city. However, continuous distribution in an intermittent system risks increasing NRW. Further, Disi water production costs, excluding operational expenses, is quite high (Humpal et al. 2012) due to the complex geography of water production, transfer from low to high elevation, and the rising energy prices. The total cost of producing and delivering each cubic meter of non-Disi water in 2011 was 1.34 Jordanian Dinars whereas the average price charged to the companies was 0.67 Jordanian Dinars (Najjar and Telfah 2012). Disi water production costs two to three times as much, but will be sold to the limited liability companies at rates similar to non-Disi waters (Policymaker Twelve 2013).¹⁴ Subsidies from the Ministry of Finance generally allow WAJ to sell bulk water at prices less than the cost of production to the limited liability companies (Humpal et al. 2012). This arrangement, however, is unsustainable because it obscures the sector's financial reality (USAID 2011), and will likely be compounded by the Disi project.

The ISSP project intends to close the deficit by restructuring bulk water prices according to PMU recommendations (Policymaker Four 2012). Accordingly, the ISSP proposes to revise the tariff recommendation process to enhance revenue generation. Once it is fully empowered and protected, the PMU will have the authority to propose carefully studied tariff revisions to the Council of Ministers. Currently, there are two block tariffs in place for urban water supplies: one for Amman and one for the rest of

system. This was designed to reduce water loss and reduce energy consumption (Abu-Shams and Rabadi 2003b). Yet, intermittent distribution systems also accelerate deterioration of water networks because of pressure fluctuations. Water pipes last longer with continuous circulation of water. Under intermittent systems, changes in water pressure affect pipe and connection points and can accelerate corrosion. Repairs are therefore frequently needed but hard to track. There are also increased health concerns as back flow from negative pressure in the water network can pull contaminants into the water supply system if not carefully monitored (Ainsworth and World Health Organization 2004).

¹⁴ These are bulk water prices imposed on the limited liability companies. They are not the prices households pay for each cubic meter consumed.

Jordan (Najjar and Telfah 2012). The current tariff structure has been criticized because it does little for cost recovery and subsidizes wealthy households (Hagan 2008). Najjar and Telfah (2012) argue that the tariff does not differentiate between subscribers according to their income. For example, low-income households tend to be larger and thus their water use may place them higher price blocks (Ray 2010). Nevertheless, the tariff reforms are seen as necessary to cover production costs, especially because electricity prices, a critical input for the production and distribution of water, have significantly increased in recent years.

In the last five years, Jordan imported over 90 percent of its energy needs (USAID 2010) – the majority from Egypt (IMF 2012a) – with the water sector utilizing 12 percent of the country’s energy capacity (Najjar and Telfah 2012). Significant amounts of energy are needed to access declining groundwater reservoirs and pump water from low to high elevations. The heavy reliance on energy imports has left Jordan susceptible to regional and market crises. For example, Jordan had to explore alternative energy options after international oil prices spiked in 2008 and in 2011 after Egyptian protesters in the Sinai destroyed the Arab Gas Pipeline bringing cheap natural gas to Jordan.¹⁵ The Jordanian government responded with new subsidies as power plants have resorted to burning heavy oil and diesel for electricity generation, which are four times more costly than natural gas (IMF 2012b). Energy production alone has become a major burden on the Jordanian government, consuming as much as 16 percent of the 2011 GDP (IMF 2012a). The high cost of energy production has significantly increased operating

¹⁵ The destruction of the Arab Gas Pipeline coincided with the popular uprising against President Hosni Mubarak. The pipeline provided natural gas to Jordan via Israel.

costs and further constrained investment in capital enhancement and rehabilitation, which has reinforced water loss.

Ultimately, advocates of the ISSP argue that, without reform, Jordan will risk losing donor confidence (Sommaripa 2011). Corporate restructuring, it is argued, will close the gaps in governance, address institutional overlap concerns, and create a more sustainable financial situation by easing the conditions of decision-making. This argument is only feasible by characterizing the supply and demand mismatch, institutional mismanagement, and energy and cost concerns are framed through engineering and economic frameworks. Such representations, however, obscure political realities and neutralize critical institutional dynamics in water management.

Reconsidering the Evidence: Critiques of Mainstream Representation

Mainstream characterizations of Jordan's water crises suggest dire outcomes if reforms are not implemented. These descriptions generally, and the rationale for corporate restructuring specifically, however, are based on overly technical characterizations of supply and demand, institutional, and financial issues. Missing from these characterizations are the ways that these issues are embedded within and shaped by political and institutional constraints. In this section, the three themes will be reexamined through an analysis of empirical examples from Jordan and explain how reliance on engineering and economic frameworks misrepresent the sources of the water sector's problems and the systems by which the sector operates.

The Politics of Water Supply and Demand

Advocates of corporate restructuring in Jordan have criticized the water sector for its failure to achieve balance between water supply production and growing demand. This claim is depicted through quantitative measurements of water resources, per capita availability, and degrees of household consumption. While these characterizations allow for comparisons over time, they also obscure critical contexts within which the state of water resources, production of new supplies, and consumption are embedded. A more effective characterization of the supply and demand mismatch can be developed through careful consideration of existing water supplies and the realities of producing new resources, regional geopolitical tensions and negotiations over surface and groundwater resources, and dynamics of household consumption and access across geographies and socioeconomic conditions.

The first main political constraint ignored in mainstream representations is the effect of Jordan's contentious regional political affairs on water supplies and production capacity. Proposed plans to increase water supply production exclude the Jordan and Yarmouk Rivers from consideration because the 1994 peace treaty with Israel requires institutional collaboration on water supply projects (Beaumont 1997). According to the treaty, Israel has the right to pump 12 million cubic meters during the summer and 13 million cubic meters during the winter from the Yarmouk River. Jordan, on the other hand, has rights to any water unused after Israeli consumption (Beaumont 1997). This means that Jordan's guaranteed access is subject to precipitation trends annually, and thus nullify any guarantee it may have had to water. Further, Israel also has the right to pump up to 20 million cubic meters from the Yarmouk in the winter in exchange for equal

transfers back to Jordan from the Jordan River in the summer (Beaumont 1997). The headwaters of the Jordan River, however, remain entirely under Israeli control and were excluded from treaty negotiations and thus leave Jordan with little legal and or political recourse to ensure the water transfers will be realized.

Similarly, advocates of corporate restructuring call for reducing groundwater abstraction to safe yields. The majority of water for municipal, industrial, and agricultural demand, however, comes from groundwater resources. Analysts calling for corporate restructuring overlook the power of key lobbies, principally agriculture, in water policy and planning. Though the Water Council is intended to channel this political influence, it is unlikely that the state will insist on radical conservation measures out of fear of public discontent. Programs designed to encourage more sustainable irrigation practices and community-participation in rural conservation schemes have been met with widespread resistance from farming communities (Policymaker Six 2013). Their reluctance to participate stems from fears about reduced support and collapse of livelihoods.

Further, reductions in groundwater abstractions would have to be offset by development of alternative supplies. Jordan's production capacity is significantly underdeveloped (Beaumont 1997). Production of new supplies requires significant capital investments and energy requirements. Desalination is one such example. In 2013, political pundits hailed an Israeli, Palestinian, and Jordanian agreement to coordinate the design and implementation of the Red Sea- Dead Sea desalination project. There are multiple goals for this project. First, authorities hope to reverse the decline of the Dead Sea stemming from reduced inflow from the Jordan River. Brine from desalinated Red Sea water will be transferred to the Dead Sea. Second, the desalination process will

generate electricity for the three parties. Third, the plant will produce at least 80 million cubic meters of water annually (IRIN 2014).

The plans are based on a complex purchasing and allocation arrangement between the three parties. Israel is expected to buy 50 million cubic meters at 0.29 Jordanian Dinars per cubic meter. The rest of the water produced will be reserved for the Aqaba Governorate. In exchange, Jordan can purchase about 50 million cubic meters of water from Israel's northern water resources to provide water to Amman and north Jordan. The degree of engineering and institutional collaboration required is going to be a challenge, particularly as Jordanian authorities become increasingly more cautious with respect to open collaboration with the Israeli government. Further, many argue that this project is simply too expensive, with \$4 billion price tag, and that the potential environmental consequences for the Dead Sea outweigh the potential benefits (IRIN 2014). The World Bank's feasibility study raised a number of additional issues, including environmental impacts on the Red Sea, disturbance to important archaeological sites, societal impacts through land reclamation and land use changes, and energy inputs required for pumping and desalination (Barrett 2012). These feasibility questions and the high cost of the project has thus far deterred donor interest (IRIN 2014).

While these examples reflect the political and institutional challenges shaped by Jordan's geopolitical relationships, Jordan has not performed well when it comes to realizing major projects domestically. It is not uncommon for major infrastructure or development projects to experience significant delays in Jordan. The completion of the Disi water conveyance project, for example, was supposed to coincide with the completion of the rehabilitation of Amman's water network in the early 2000s. The Disi

project is supposed to transfer waters from the Disi aquifer on the border with Saudi Arabia to Amman, and allow for the continuous distribution of water throughout the city. However, the Disi project experienced several setbacks due to continual calls to revisit contracting negotiations and project plans by changing authorities within the MWI, increases in steel prices internationally, and rising operational costs (Policymaker One 2012). Consequently, the delays forced project officials to abandon the construction of a continuous supply network, and instead refurbished the system based on an intermittent distribution design (Policymaker Three 2012). The project was finally completed in 2013; though officials now worry that non-revenue water loss will increase, as higher volumes of water pumped through a network designed for intermittent distribution will accelerate the deterioration of the water networks.

A clearer understanding of why Jordan faces significant challenges in producing new supplies requires reconsideration of how demand is characterized. The reason is that most mainstream characterizations of demand are tied to supplies through per capita availability. For example, most mainstream characterizations of Jordan's supply and demand mismatch note that Jordan has risen in the water scarcity rankings since its independence in 1946. The baseline benchmark for per capita availability in the NWMP is from 1946, the year of Jordan's independence. Nearly 70 years later, per capita availability has declined such that Jordan is characterized by "severe water scarcity." Forecasted supplies and demand suggest that this gap is likely to grow. Yet, much like declining water supplies and forecasted production do not reflect the political and institutional challenges affecting the water sector, declining per capita availability does not reflect how, why, or when the mismatch was produced. For example, per capita

availability measurements for periods of refugee influx or intervals between the refugee crises do not exist. Such measurements could help policymakers plan for a number of water management scenarios and diminish the need for emergency responses – albeit to a limited extent.

Further, such measurements do not adequately characterize household access and consumption trends across geography and socio-economic class. For example, since 2011, Jordan has received approximately 600,000 Syrians. This no doubt presents key challenges for water officials. Miyahuna’s Director of Customer Services states,

Natural growth is high. The birth rate is around 3.8 percent...we have been lucky with forced migration...These forced migrations affect us a lot. Even in planning because when you do long term plan for 10 or 15 years, you predict that the city will grow under natural growth, about 3.5 percent, this is the normal growth...but since 1967 till now, we have not planned well and we cannot because every 10 to 12 years, we have jumps – million or half a million. So the plan goes with the wind (Policymaker Thirteen 2013).

His claims reveal the frustration of being unable to keep up with Jordan’s rapidly changing demographics. Yet, a careful analysis suggests that his frustrations should not necessarily be targeted towards urban households.

Trends show that municipal water consumption has remained steady since 1994, despite a near 50 percent increase in population (Humpal et al. 2012). Households already have limited consumption capacity and practice water conservation (Potter and Darmame 2010). Indeed, a Syrian refugee family of eight people living in a small apartment in Irbid is unlikely to consume the same amount of water as a wealthy family in Amman living in a single-family home with a garden and a swimming pool. Part of the problem, therefore, is that there is a lack of good data. For example, the National Water Master Plan’s demand forecasts are based on only five years of billing data (1996 to 2001) provided by the Water Authority of Jordan (MWI 2004) – well before the Iraqi and

Syrian crises. As such, these forecasts estimate that 9.20 million people will be living in Jordan by 2020 in contrast to the reality of nearly 8 million people living in Jordan by 2012. This naturally enflames debates about the exact amounts of future water supply and demand (Humpal et al. 2012) and also raises questions about why supply and demand analyses are not situated within their political and institutional realities.

It can be argued that the representations of per capita demand and debates over new water supplies are politically charged and politically expedient. Politically, water authorities regularly cite Jordan's ongoing refugee crisis as the culprit for its recent problems while neglecting the nature of its political treaty with Israel or its own institutional challenges. Similarly, the case for corporate restructuring depoliticizes the characterizations of the supply and demand mismatch and generate consensus on the risks, especially for poor households, if the status quo prevails (Humpal et al. 2012; Khaleq and Dziegielewski 2006; Khaleq 2008; Hazaimh 2008; Hadadin and Tarawneh 2007; Abu-Shams and Rabadi 2003a).¹⁶ Such characterizations, however, obscure the political and institutional realities that underpin the water sector's supply and demand challenges. As such, a closer look at the central government's political influence over the water sector points and the institutional constraints impeding on the sector's ability to realize sound management merits a closer look.

¹⁶ The National Water Master Plan is a key source of framing for this particular aspect of the crisis. The plan reports on a number of different facets of demand, including drinking water and irrigation, noting that demand will reach 1565 million cubic meters per capita by 2020, with municipal demand likely to grow from 83 liters per capita per day to 142 liters per capita per day (MWI 2004).

Politics of Institutional Overlap and Mismanagement

Since the mid-1990s, Jordan's public water sector institutions have been criticized for mismanagement, institutional overlap, and overly bureaucratic nature. (Hagan 2008). Corporate restructuring advocates have utilized these characterizations in their justification for reform, especially as mainstream assessments detail the impacts of inadequate water laws and political influence on the water sector. These assessments, however, are based on ahistorical and apolitical representations of institutional dynamics and near exclusion of political realities. Attempting to transform institutional responsibilities without addressing these factors may end up the sector's management crises.

The principal factor that first and foremost guides the water sector is regime security. This plays an instrumental role in shaping how the water sector operates. The King's Council of Ministers, which is responsible for all political decisions, acts as a de facto institution protecting the status quo in which the central government balances reform, public opinion, and regime security. Ministerial executive decisions, such as a reversal of agreed upon development programs, operate within this balancing act (Hussein, Abu Sharar, and Battikhi 2005). This political influence over the sector is expressed through formal and informal means. Formally, the Council of Ministers remains in control over major decisions, such as adoption of new water laws, transformation of institutional responsibilities, or tariff revisions. Informally, this means that the Council of Ministers clips the capacity of the Ministry of Water and Irrigation to be responsible for water sector strategy and planning, especially as ministers take decision reflecting the short-term interests of the Council rather than the long-term

interests of the water sector. While the corporate restructuring program seeks to divert the influence of the minister through the Water Council, at no point do ISSP recommendations discuss the influence of the Council of Ministers nor suggest that it be subject to reforms. The irony is that the Council of Ministers has proven to be a key institutional barrier to the sector's long-term sustainability, but any measure that would seek to either channel or diminish this influence would require their participation.

Consequently, ISSP recommendations calling for centralizing management responsibilities within the MWI and granting regulatory responsibilities to the PMU will do little to change the water sector's managerial landscape without reforming the power of the Council of Ministers. Further, this influence of the Council of Ministers will have the effect of continually centralizing public opinion, even if informally, in water policy debates. Authorities are concerned about how Jordanians will react to price increases and subsidy reductions and how public sector employees will react to reform programs. Will the employees be convinced or coerced into participating in the reform process? On the one hand, a new water law is required for WAJ to be legally bound to its new responsibilities as a bulk water supplier, but in reality the adoption of a new water law will only happen after years of negotiation – perhaps after the corporate restructuring program has concluded. On the other hand, even if WAJ leaders agree to the shift, they may find it difficult to convince public sector employees to take on new responsibilities. WAJ employees are strongly positioned to resist these efforts because civil service laws protect their tenure.

Consequently, ISSP recommendations for institutional transformation come off as naive. This naivety, however, stems from a failure to adequately understand or situate the

management crises within a systematic understanding of how the sector operates. Indeed, there is little reason to think that institutional transformations and corporate frameworks will mitigate the sector's fragmented coordination when in reality most of the public sector employees are likely to remain the same. Without effective buy-in from civil service employees, it should be expected that reforms will be slow to proceed, and perhaps even reversed after project funds are completely dispersed. Indeed, the demand management programs discussed earlier are highly indicative of what may be to come. It is unreasonable to expect institutional cooperation with significant numbers of employees knowing that civil service laws protect their livelihoods.

Consequently, initiatives that produce no immediate benefit for the employee are likely to be dismissed as added work or a threat to their job security. For example, the MWI's demand management programs produce little direct benefit to the limited liability companies and WAJ operations directorates. This is compounded by the fact that municipal water institutions are set up as independent authorities that are competing for limited capital in order to treat and distribute water within their defined geographical jurisdictions. As such, these municipal water services have little incentive to support or prioritize national level planning. The result of this is that programs like demand management become fractured at the national and municipal scales, with the MWI scrambling for data in order to generate national master plans (Policymaker Eleven 2013) and Miyahuna pursuing its own awareness campaigns, media advertisements, and youth programs with limited support or consultation from the MWI (Policymaker Seven 2013). It is important to keep in mind that mainstream claims about institutional mismanagement and overlapping responsibilities are not principal sources of the sector's crises. Rather,

they are symptoms of underlying political realities and institutional constraints affecting the national and municipal sectors.

This reiterated point is exemplified by Miyahuna's constrained capacity to plan. For example, Miyahuna officials lamented the lack of communication about the Disi conveyance project from WAJ and MWI officials. Miyahuna authorities were told to prepare for higher volumes of water and provide continuous supplies to all households without detailed information of when deliveries would commence (Policymaker One 2012). Further, Miyahuna authorities had little say in the negotiations over how much water would be sold to them by WAJ and at what price (Policymaker Twelve 2013), while Miyahuna has no say over water prices charged to consumers. Consequently, Miyahuna has had to finance the replacement of several hundred thousand water meters to accommodate the shift from intermittent to continuous supplies along with adjusting billing procedures and operations. Naturally, this heightened fears that progress in billing and water use monitoring since the network rehabilitation project in the early 2000s would be set back by higher operational expenditures and increases in non-revenue water loss (Policymaker One 2012). The issue here, however, is not that WAJ and the MWI failed to communicate effectively with Miyahuna authorities.

Even if WAJ and MWI were completely transparent about when deliveries would commence and at what pace, Miyahuna would still scramble to accommodate the continuous supplies. This all stems from the failure to coordinate the completion of the network rehabilitation project and the Disi conveyance project. Institutional constraints on Miyahuna's financial management reinforce its inability to effectively respond to or coordinate the reception of Disi water. Miyahuna is unable to set water prices or secure

financing for infrastructure development or rehabilitation, both of which are tightly related to the state and quality of water networks. As such, the push for corporatizing municipal water utilities throughout the country must critically reflect on the conditions through which the corporatization process is taking place and how such institutions will be constrained institutionally.

Mainstream characterizations of institutional overlap and mismanagement fail to acknowledge the political and institutional realities within which the water sector operates. Advocates of privatization draw on these characterizations to argue that the sector's crises can easily be modified through corporate restructuring. However, this assumes that all levels of the national and municipal water sector institutions can be neatly repackaged. Instead, the influence of political and institutional constraints on water management must be acknowledged because they become an inherent part of the design and operation of the water sector. The examples of the previously implemented demand management programs and coordination of major water supply projects reflect how these constraints play out in different ways. The stakes of not addressing these realities are high, especially since operational and capital costs continue to determine how well the water sector can accommodate change.

Politics of Water Costs and Deficits

Financial stability is essential for a stable water sector. Failure to implement meaningful reforms that reduce financial deficits while also streamlining capital expenditures, operating costs, and revenue streams may deter donor interest in financing future projects (Sommaripa 2011). Mainstream analysts argue that Jordan's water sector

is financially unstable because it has failed to integrate revisions to water tariffs and bulk water prices with strategic investments in alternative energy sources, production of new water supplies, and infrastructure expansion and rehabilitation (USAID 2012b; Sommaripa 2011). Such conclusions about the water sector's financial health are accurate but they also neglect why the water sector has been unable to stabilize.

The main source of the water sector's financial struggles, an issues missed in mainstream reports, is the dynamic relationship between state subsidies and donor lending. Donors have played a key role in financing the sector's development since independence in 1946 (Ditzel 2008). Since 1952, the US government, through USAID/Jordan, has provided approximately \$6 billion in economic assistance to the Hashemite Kingdom of Jordan. Half of that amount was allocated after 2002 (Bell 2011). Consequently, donor support has become as a critical lifeline for the water sector, particularly for capital expenditures. Between 2005 and 2010, donors covered 46 percent of the total capital costs, 73 percent of which came from USAID (Humpal et al. 2012). In the same time period, WAJ financed 39 percent of their investments in the construction and rehabilitation of infrastructure (totaling to 900 million Jordanian Dinars) through international and public bonds (Humpal et al. 2012).

The extensive support provided by donors raises questions about how this has shaped the managerial and financial dynamics of the water sector. On the one hand, without donor support, it is unlikely that the water sector would be able to continue investing in infrastructure expansion and rehabilitation. On the other hand, donor lending has saddled the water sector with extensive debt. Between 2005 and 2010, debt surged from 64 million Jordanian Dinars to 621 million Jordanian Dinars – an increase of 900

percent (Humpal et al. 2012). Jordan's water sector is thus stuck within the institutional reliance on donor support for capital expenditures because without them operational costs would skyrocket and services would rapidly deteriorate.

Municipal water services operated by WAJ and the limited liability companies are financially afloat only because the central government provides direct and indirect subsidies and assists with debt repayment. Mainstream characterizations of Jordan's water sector cite these subsidies as a key reason for the sector's financial instability and as such recommend cutting subsidies to the water sector and requiring bulk water and energy prices to reflect their real market cost of production. If such measures are implemented, bankruptcy becomes a real possibility for Miyahuna and the limited liability companies. This is due to the fact that the limited liability companies, and WAJ, rely extensively on government support to cover operating costs and capital expenditures (Policymaker Twelve 2013). Granted, this is not a problem unique to Jordan as one of the common criticisms of public sector institutions is that they almost universally fall into debt in their efforts to subsidize universal access to water. What is often excluded in mainstream criticisms of public sector debt, however, is that debt cycles produced by donor conditions reinforce the subsidization of municipal water services.

These institutional constraints to the debt cycle are reinforced by political factors outside the control of water sector officials. First, mainstream characterizations do not adequately address the fact that water sector authorities in the MWI and WAJ cannot introduce new tariffs without approval from the Council of Ministers and tariff negotiations are politically fraught as ministers are afraid of upsetting the general public. Second, mainstream characterizations have not produced tailored recommendations that

address the water sector authorities energy costs. Electricity costs account for the majority of Miyahuna's operating expenditures from lifting, treating, and distributing water across Jordan. Jordan's lack of domestic energy resources means that it is held hostage by the region's energy politics. The destruction of the Arab Gas Pipeline in the Sinai Peninsula exemplifies Jordan's susceptibility to regional dynamics. Diversifying its access to energy would ensure more sustainable access and lower prices. This, however, is easier said than done. Members of the Gulf Cooperation Council reluctantly agreed to provide critical foreign aid to Jordan after the destruction of the Arab Gas Pipeline pushed the Jordanian economy to the brink of crisis (The Peninsula 2012). Jordan has explored alternative energy options from Qatar (Jordan Times 2013) and Israel (Trilnick 2013), but to date no deals have been reached. Jordanian lawmakers have protested potential plans for an Israeli gas deal in light of Israeli escalation of violence in the Gaza Strip and the West Bank (Reed and Krauss 2014). Additionally, gas purchases from Qatar is not yet a viable option because the natural gas terminal at the Port of Aqaba is not yet complete (Jordan Times 2013). Some also argue that the Gulf States have used their financial clout to manipulate regional affairs. For example, some have linked Syria's rejection in 2009 of a Qatari proposal to build natural gas pipeline that would pass through Jordan and Syria into Turkey with Qatar's support for opposition movements fighting the Assad regime in 2011 and 2012 (Ahmed 2013). Jordan, in the end, became a key victim of the escalation of violence with over half a million Syrian refugees.

Ultimately, mainstream analyses characterize the financial crisis in ways that link corporate restructuring to improvements in efficiency and financial stability. Mainstream claims about Jordan's water crisis, however, tend to focus only the sector's failure to

keep operating costs low and invest in infrastructure rehabilitation and expansion. The financial deficits and energy crisis are not direct symptoms of poor management in the water sector. Instead, they are outcome of institutional dynamics produced by government subsidies and donor support and domestic and regional political crises. As such, if subsidies are reduced, as recommended, the sector will no longer be able to cover operating costs let alone meet its necessary capital investments. The sector is thus institutionally and politically reliant on borrowed money to finance major projects and extensive government support for debt repayment and operational costs.

Conclusion

It is important to understand how Jordan's water crises are framed in mainstream analyses because market based management has become hegemonic (Harris, Goldin, and Sneddon 2013). The mainstream characterizations can be divided into three themes: 1) water supply and demand, 2) institutional overlap and mismanagement, and 3) financial health. Analysts draw on these three themes in building the case for reform. These characterizations, however, are based on engineering and economic frameworks that do not reflect the institutional and political realities that underlie the challenges associated with supply and demand, institutional mismanagement and overlap, and financial realities.

Consequently, any assessment of the supply and demand mismatch must account for Jordan's geopolitical constraints with respect to accessing shared surface water resources or challenges associating with collaborative production of new supplies. Jordan has been severely affected by regional instability over the past few years, which has

simultaneously reduced the likelihood of collaboration with its neighbors and between water sector institutions while also reinforcing domestic humanitarian, economic, and political crises. These domestic and regional dynamics strongly influence the government's capacity to manage public deficits through finance reforms and public opinion. Economic and engineering frameworks attempting to frame these issues obscure the ways that critical political, social, and economic realities seriously shape operational systems and decision-making processes in Jordan.

Mainstream water policy debates must address critical questions about jurisdiction, power, capacities, and abilities of water institutions. Framing of water sector crises is an inherently political process that requires acute understanding of local political realities and institutional dynamics (Mahayni 2013a). Scholarship explains how representation processes are inherently political – abstracting complex realities and translating them into easily interpretable facts (Stengers 2000) despite the limitations of framing water scientifically (Linton 2010; Mehta 2005). These facts take on meaning when policymakers and planners situate the facts within development paradigms and design programs to create order out of perceived chaos (Mitchell 1988). Further, it is through these processes that development institutions and projects are created and implemented (Scott 1998). This chapter builds on these perspectives by extending them to the debates about privatization in water management. Specifically, the chapter highlights how mainstream characterizations obscure the political and institutional realities of water sector crises in ways conducive for the advocacy of privatization and corporate restructuring.

Ultimately, it is important to keep in mind that critiques of representation should focus on the ways that policymakers utilize particular types of knowledge, and for what they exclude. All policy is political. The challenge, therefore, is to see and understand how water policy framing, development, and implementation are processes requiring careful consideration of environmental, social, economic, and political realities. The challenge ahead is to forge an analytical space for acknowledging complex human-environment relationships and political realities in the policymaking process. The first step in doing so is to understand how the institutional and political constraints affecting contemporary water management crises were produced and evolved throughout the course of the water sector's development. This is attempted in Chapter Three.

Chapter 3 Producing Constraints to Water Management

Introduction

Privatization of municipal water services represents a shift away from public sector management (Swyngedouw 2005) despite the fact that management failures are common to both regimes (Bakker 2010). Scholarship on the dynamics of municipal water services pre- and post-privatization, however, are rarely addressed together. While the public sector management crises were instrumental for justifying privatization programs, there has been little research into how the underlying reasons for these crises carried into, or shaped, reform projects. Making sense of this relationship requires understanding the history of urban water systems and institutions, and their development vis-à-vis state building processes.

State formation and making processes facilitated the development of water sector development (Baker 2005) in ways that concentrated power (Swyngedouw 2014; Alatout 2009; Swyngedouw 2007b; Alatout 2006; Swyngedouw 1999) and changed local governance dynamics over water resources (Haines 2010; Gelles 2000; Gilmartin 1996; Lansing 1991). Further, research shows that colonial and post-colonial policies played an instrumental role in shaping the dynamics of municipal water services (Gandy 2006; Swyngedouw 2004; Dill and Crow 2014). Together, these two arguments can help explain why privatization programs have largely failed throughout the global South.

This chapter attempts to link the research on state building and water sector development with literatures on histories of urban water management using the case of Amman, Jordan. The case of Amman suggests that contemporary management crises cannot be understood without attending to donor financing projects and national water

sector development over the last fifty years. Donors and the Jordanian government have continuously partnered on institutional and policy development initiatives in order to improve and expand water management capacity at the municipal and national level. This chapter argues that the combination of donor-funded projects since the 1960s, state security, and crisis management led to the emergence, and continual evolution, of institutional and political constraints. These constraints have continually produced management failures in municipal and national water services, reflecting their endemic nature in the water sector, creating a seemingly perpetual crisis in the water sector.

This argument is developed through an analysis of Jordan's water sector history and donor-funded projects in Amman and Jordan's national water sector since the early 1960s. This chapter is divided into three sections. First, it begins with a historical overview of the water sector, urban planning, and development of the state. Second, the chapter analyzes three eras of Amman's water sector development (1960s, 1970s to early 1980s, and mid-1980s to 1990s), with specific focus on how infrastructural and institutional development reinforced the conditions of management failures over time. Third, the chapter concludes with a discussion of the significance of Jordan to academic scholarship about water management crises and governance failures.

State Building, the Water Sector, and Amman

Since independence, state building in Jordan has been mediated by several major humanitarian crises, regime security, and development goals (Ababsa 2013). These factors had an impact on planning and governance frameworks at the national and municipal levels. Initially, the state exercised strong influence over national development

and urban planning in an effort to consolidate its power over society and resources. In the 1970s and early 1980s, Jordan's experienced strong economic growth that facilitated the creation of a strong bureaucracy whereupon regime security and public acquiescence dominated water policies. By the late 1980s and early 1990s, a regional economic downturn forced Jordan into structural adjustment policies. With support from international financial institutions, Jordan adopted market-friendly policies in order to entice higher degrees of foreign investment. The state building processes and transition to market frameworks has left a lasting footprint on the water sector. As such, water management institutions have evolved in-line with dominant management trends overtime, with political and institutional constraints shaping water management goals, planning processes, and the institutional reforms.

State Building in Jordan and Amman's Urban Development

Over the past 100 years, institution building and expressions of state power have been closely tied to the major development projects and its management of major events, including several refugee crises and foreign investment in capital-intensive projects. In the 1920s, two decades before independence, the Hashemite family selected Amman as the capital of the Trans-Jordan Mandate over the economically and politically strong city of al-Salt in order to consolidate their power (Tell 2013). Amman was considered to be a strategic military location because it was linked to the other major urban centers in the region by the Hijaz Railway (Hanania 2011; Rogan 1996). In turn, Mandate authorities built new state institutions and projected symbolic power throughout Amman in an effort to bolster the city's local and regional status.

This model of top-down institution building carried into independence as Jordanian authorities sought to capitalize on regional finance and incoming migration. The state offered public sector job opportunities for Jordanians and regional migrants (Potter et al. 2009; Potter et al. 2007) while also coordinating with UN agencies to resettle incoming refugees in and around Amman. Authorities set up the Al-Hussein and Wehdat refugee camps for Palestinians expelled from their homes in 1948 and 1967, which later became permanent settlements that supported active businesses, schools, and social services (al-Hamarneh 2002). By the 1970s, state control had been largely consolidated. Authorities launched campaigns to attract regional investment in Amman and convinced major banks in the Gulf to open branches in Amman, shifting the commercial center from the historic downtown to newly developed western parts of the city (Biegel 1996). The state also encouraged capitalists fleeing the Lebanese and Iraqi wars to invest in Jordan (Biegel 1996).

A regional economic crisis in the late 1980s and 1990s crippled Jordan's economy as foreign investment and remittances from Jordanian workers abroad precipitously declined (Biegel 1996). By the late 1980s, Jordan transitioned towards a more market-oriented economy. Throughout the 1990s, authorities passed laws to ease investments and rewarded major investors with permanent residency and citizenship (Olwan 2006). This was an attractive opportunity for wealthy Iraqis fleeing the second Gulf War (Parker 2009). The state also created new institutions to facilitate major investment projects (Daher 2008) and adopted market-oriented planning and governance frameworks (Beauregard and Marpillero-Colomina 2011; Parker 2009). For example, the state created MAWARED, an autonomous state-owned enterprise, to oversee the redevelopment of the

Abdali district in Amman. Authorities destroyed the previous site of the General Jordan Armed Forces Headquarters and relocated a public transportation hub in the center of Amman for the Abdali Project and sold land at highly subsidized prices for the construction of a multi-million dollar exclusive commercial and residential center (Daher 2008). The state effectively deregulated urban planning in order to make this project a reality.

Ultimately, since Jordan's independence in 1946, state security and economic interests had profound impacts on development planning at the national and municipal levels. This ultimately resulted in Amman becoming the country's political and economic center. The water sector's evolution mirrored this dynamic, as the state utilized water management to secure Amman as the capital city and establishing regime legitimacy and security in the Jordan Valley. These two political priorities also influenced the nature of the water sector's institutional evolution. Over time, the water sector came to exemplify the nature of Jordan's political and economic transformations and also highlight how particular political and institutional constraints became part and parcel of water management at the municipal and national levels.

The Origins of Jordan's Water Institutions

The state's management of local and regional events significantly influenced Jordan's water sector since its independence. Two particular factors played a crucial role in shaping the sector's development. On the one hand, Jordanian authorities sought greater control over the Jordan Valley after the Palestinian refugee crises created security and border concerns. On the other hand, the state sought to consolidate its power and

centralize its authority over the young state by prioritizing Amman's water management needs. Over time, the state embarked on new management plans and initiatives in ways that reflected the rapidly changing contexts in the country.

Jordan's water sector has its origins in the early years of British Mandate Trans-Jordan. Municipal councils held responsibility over local use and distribution while the central government facilitated project implementation, drafted legislation, and handled capital investment costs (Haddadin 2006). At the time, an Executive Council and later Legislative Council were responsible for drafting and implementing policies with technical, legal, and financial support from British civilian and military administrators, creating the foundations for a national infrastructure. Legislative development in Trans-Jordan Mandate pieced together Ottoman laws on land and water rights with British Mandate Palestine regulations (Haddadin 2006). This institutionalized contradictions between Jordanian, Ottoman, and British mandate water laws and land rights, an issue that plagued the Levant area writ large (see Warriner 1981).¹⁷

Brewing insecurity on the border with Palestine heightened the Mandate's nascent control over land and water. The Jordan Valley became a strategic site for development as authorities sought to buffer the geopolitical crisis in Palestine. In 1939 Michael Ionides, the Mandate's Projects Department manager, assessed the feasibility of sharing the Jordan River Basin as part of a political solution to Zionist settlement in the West Bank. Ionides concluded that the Jordan River could not meet Jordanian and Zionist

¹⁷ In the 1920s and 1930s, tensions due to increasing Jewish migration into mandate-era Palestine resulted in government legislation over the use of water in what Haddadin (2006) considers to be the first foray into regional or international water issues. This dissertation does not delve into these issues, but it should be acknowledged that water legislation and institutions were and continue to be shaped by regional geopolitical concerns.

development plans without bi-party coordination (Haddadin 2000). Trans-Jordanian authorities perceived Zionist encroachment and confiscation of Palestinian lands as a threat to its security.

Following Jordan's independence, tensions increased after Zionist administrators began water transfers away from the Jordan Valley for agricultural production. Jordanian authorities feared this would stunt development and further deteriorate border security. In response, the Kingdom hired Sir Murdoch MacDonald and Partners, a British consulting firm, to study the development potential of the Yarmouk and Jordan River Basins in 1946 (Baker and Harza Engineering 1955; Haddadin 2006). Their findings suggested that water transfers from the Jordan Valley would undermine local irrigation (Haddadin 2000). These development challenges were compounded by Israel's continued appropriation of water and the expulsion of thousands of Palestinians into the West Bank and Jordan in 1948. By this stage, Jordan and Israel were at war.

In a peace-building effort, President Dwight Eisenhower sent Ambassador Eric Johnston to negotiate a unified development plan for the Jordan Valley between Israel and Jordan. Jordanian authorities were skeptical of Johnston because of American support for Israel, viewing his efforts as an attempt to convince Arab states to recognize Israel and undermine the Palestinians the right of return (Haddadin 2000). While Johnston's shuttle diplomacy secured support from the Israelis, Jordanians, and other Arab leaders over the technical dimensions of the project (Beaumont 1997), no political agreement was reached (Haddadin 2000). This ultimately cemented Israeli and Jordanian non-cooperation in water management in the Jordan Valley until the signing of the peace treaty in 1994.

Jordan was thus pressed in two ways. Zionist administrators continued water transfers and thus reducing Jordanian access. Jordanian authorities, however, needed to balance their desire to transfer water away from the Jordan Valley with fostering local development in the Jordan Valley. Jordanian officials believed that security could be restored through permanent settlement and income-generating opportunities that would pacify widespread anger amongst Palestinian and Jordanian farmers (Haddadin 2006). Between 1946 and 1957, Jordan embarked on a systematic effort to delineate water and land rights in the Jordan River Basin according to land tenure laws denoted in the Ottoman Gazette (Haddadin 2006)¹⁸ by using triangulation land survey methods – a British technique for mapping land (Mitchell 2002). Land rights helped mitigate tension between nomadic Bedouin communities and Palestinian refugees (Tell 2013; Ababsa 2013) and provided a framework for public assistance to large-scale development projects (Ababsa 2013; Haddadin, Sunna', and Al Rashid 2006).¹⁹ For example, landownership permitted partial state financing of irrigation projects on the condition that landowners provide two-thirds of the capital cost (Haddadin 2006). Through such projects, Jordanian authorities gained political capital with beneficiaries of public assistance (Ababsa 2013), in turn, securing the Jordan Valley and consolidating state power.

¹⁸ While Islamic Shari'a law grants households the right to land and water, ultimate ownership remains with God with the state retaining the right to administer and distribute land. Yet, despite longstanding activity in the development of Islamic jurisprudence, the ideas developed in Islamic law intermix with local cultural customs and political power, as individuals and communities exercise undue influence in the distribution of land (Sait and Lim 2006).

¹⁹ In 1946, the Kingdom adopted Law Number 38 the Law of Settlement of Water Rights, which detailed the procedures by which water rights were specified. Six years later, Law Number 40 tied water rights to land definitions because irrigation farmers utilized the majority of water.

As tensions in the Jordan Valley eased, state officials were now faced with new tensions between rural and urban communities (see Tell 2013). As a growing city, and the center of political power, state officials prioritized the development of Amman's municipal water services, which required significant attention due to major refugee camps and rapid urbanization. By the 1950s and 1960s, authorities consolidated municipal water management responsibilities, agricultural-related programs, and major infrastructural projects in one institution. In 1959, the Department of Irrigation, the drilling department at the Ministry of Public Works, and the Department of Water Resources Development at the Office of Consolidated Services were merged into the Central Water Authority (CWA). The CWA oversaw the development of water policies and projects throughout the country and provided bulk water supplies to municipalities. Water management responsibilities, however, remained with the municipalities (Haddadin 2006). In 1965, the Amman Municipality created a Water Department to oversee municipal water services and infrastructure management in Amman (Haddadin 2006).

This set a critical precedent for subsequent water sector development projects. In 1966 the CWA was combined with the East Ghor Canal Authority and the Department of Mining to form the Natural Resources Authority (NRA). The East Ghor Canal Authority managed what is now called the King Abdullah Canal, provides irrigation water for agricultural production (Courcier, Venot, and Molle 2005).²⁰ Unlike the CWA, the NRA assumed control over municipal water management, except in Amman. The exclusion of

²⁰ The canal stretches for 70 kilometers from the Yarmouk River along eastern bank of the Jordan River, and intercepting waters flowing into the Jordan Valley (Alkhaddar, Sheehy, and Al-Ansari 2005).

Amman from otherwise centralized water management reinforced the geographical split, and rift, between Amman, the Jordan Valley, and the rest of the country.

The 1967 Arab-Israeli war deepened the water management cleavage between Amman and the Jordan Valley. Israeli occupation of the West Bank sent a second wave of Palestinian refugees into Jordan. Political instability forced officials to question water allocation and distribution more seriously (Wolff et al. 2012). Jordan passed two laws to alleviate tensions and begin the reconstruction process in the Jordan Valley. Law Number 2 in 1973 established the Jordan Valley Commission to manage social and economic development, including water development projects (Haddadin 2006) while Law Number 56 in 1973 shifted municipal water management responsibilities from the NRA to the Domestic Water Supply Corporation (DWSC). The DWSC, however, did not hold any authority over municipal water services in Amman. In 1977, the Jordan Valley Commission became the Jordan Valley Authority (JVA), consolidating the Jordan River Tributaries Regional Corporation, parts of the Natural Resources Authority, and the DWSC offices in the Jordan Valley under one institutional umbrella (Haddadin 2006). Again, Amman was excluded from these decisions.

Ultimately, water institutions with some degree of centralization formed out of the geopolitical concerns over the Jordan Valley and Amman. Both Amman and the Jordan Valley emerged major development priorities for the state. They also were avenues through which state institutions were formed and reconfigured. Institutional transformations in the 1960s were taking place as major World Bank projects commenced. Donor-financed projects and conditions combined with the political factors

shaping institutional reforms to create dynamic institutional and political constraints on municipal and national water services.

Donor Projects and Water Sector Crises

Since the early 1960s, donors have provided critical loans for developing infrastructure, particularly for municipal water services, enhancing supply production capacity, and facilitating management and institutional reforms. Over the course of four decades, however, the combination of political factors and donor-conditions have produced and reinforced political and institutional constraints that undermined water management programs at the municipal and national level. Over time, management crises became a central characteristic of the water sector. Institutional reforms and water sector development projects simply reconfigured the conditions for management failures in the water sector.

Amman's Water Supply and Sewerage Projects 1960s to mid-1970s

In the early 1960s until the mid-1970s, donors financed water infrastructure development on the condition that institutional and management reforms were adopted. These projects interacted with regime security priorities and humanitarian crises in ways that set up the projects for failure and reinforced the water sector crises. Though decisions taken in the mid-1950s to exclude Amman's municipal water services from CWA and NRA oversight were intended to bolster its municipal water services, it was clear that Amman's water sector could not satiate demand without network expansions, increased supplies, and better services. Jordan partnered with the World Bank to develop

Amman's municipal water services, focusing especially on supply production and development of new infrastructure. The World Bank also financed reforms for Amman's water institutions. By the mid-1970s, however, Amman's water services remained in crisis – even with increased supply production and better infrastructure.

The water supply and infrastructure crisis in Amman stemmed from its rapid growth from small town to major city. In the 1930s, only 20,000 people lived in Amman. By 1952 the population increased to 108,000, and by 1961 doubled to 203,000 people (IDA 1961a). Officials were unable to maintain and expand services to the rapidly expanding population. By 1961, only two-thirds of Amman's residents had access to pumped water supplies, while the rest relied on charities and public donations. The existing infrastructure was also in poor condition, which produced extensive water loss and inconsistent service to households. The World Bank reported that “the combination of small distribution pipes, inadequate zoning and scarce water supply makes it impossible to maintain pressures, and interruptions of service lasting several days are not unusual in some areas of the city” (IDA 1961a, 2). Disruptions in the water deliveries produced fluctuations in water and air pressure, which accelerated infrastructure deterioration. As a result, an estimated 39 percent of the water circulating in the networks was lost due to leaks, resulting in lost revenue (IDA 1961a).

Revenue losses from water leaks were compounded by low prices for municipal water services. The Water Department in the Amman Municipality incurred high deficits despite the increase in paying customers. This prevented reinvestment in infrastructure and expansion to new settlements. The combination of a poor water network, cost recovery, and non-revenue water loss were identified as key priorities for the World

Bank's first project in Amman. Between 1961 and 1973, the International Development Association (IDA) extended a \$2.0 million credit to Hashemite Kingdom of Jordan for the Amman Water Supply Project.²¹ The IDA loan financed two-thirds of the project while government subsidized the remainder. The credit however was extended to Jordan's central government and not directly to the Amman Municipality. The central government, in turn, extended a loan with 4 percent annual interest to the Amman Municipality with the expectation that the debt would be repaid over a 23 year period (IDA 1961a). The goals of the project were to increase revenues, facilitate investment in infrastructure development and rehabilitation, and restructure institutions.

Officials proposed raising the price of water by 30 percent through a graduated tariff (IDA 1961a).²² Project officials reasoned that the graduated tariff revision price would increase revenues without burdening poor consumers. The IDA reported,

Since the relatively well-to-do residents and establishments located on the hills of the city, where water service is now intermittent, would be among the most immediate beneficiaries of the project, it might not be inequitable to increase average rates by introducing a more steeply graduated rate schedule than is in use at present. Such a rate schedule would also have the effect of avoiding wasteful use of water (IDA 1961a, 10).

As the main beneficiaries of network expansions, wealthier households could subsidize the costs of rehabilitation in older neighborhoods and keep prices low for poor families. Network rehabilitation and extension were complemented by the construction of new wells and pumping stations in order to increase Amman's water supply. This reduced reliance on low-quality water and the prevalence of water borne diseases in poor neighborhoods (IDA 1961a), especially in the Palestinian refugee camps (IDA 1973).

²¹ IDA credits differ from traditional World Bank loans in that they carry lower interest rates.

²² It was estimated that water rates would need to increase at least by 15 to 25 percent in order to reduce impacts on consumers and make the project financially viable (IDA 1961b).

Project officials wanted to ensure that improved management complemented the infrastructural investments. The IDA advised the Amman Municipality to create an autonomous water department with accounts separated from other departments (IDA 1961a) in order to mitigate the Water Department's budget deficits. Prior to the project, the budget of the Water Department was shared with the other municipal services, allowing for cross-subsidization in the water sector. By separating the water department and its budget, the IDA believed that the Water Department could respond more effectively to rising costs and investment needs without being subject to competing demands for capital in other municipal departments.

World Bank officials credited the Water Department for expanding water supply distribution throughout Amman. Officials, however, were unhappy with the financial performance of the Water Department (IDA 1973). Revenues remained low and water losses increased from 40 percent in 1961 to 64 percent by 1972. This meant that nearly two-thirds of the distributed water did not produce a financial return (IDA 1973). In 1971, the IDA recommended a feasibility study for the creation of a new municipal water department. In 1973, Jordan signed an official agreement with the World Bank to create the Amman Area Water and Sewerage Authority (AWSA) (Haddadin 2006; IDA 1973), which was separated from the Amman Municipality and acquired the assets and debt liabilities of the Water Department. Additionally, AWSA would serve as the World Bank's direct partner in future water sector projects.

By assuming the Water Department's debt, AWSA was not in a position to make capital investments in Amman's water networks, which would reduce non-revenue water loss. Water losses increased when several thousand new Palestinian refugees arrived in

Amman after the 1967 war with Israel. Between 1973 and 1978, the IDA extended a second credit of \$8.33 million to the Jordanian government in order to reduce water loss and improve AWSA's financial performance (IDA 1973).²³ As part of the agreement, the central government received the credit and extended a second loan to AWSA with an annual interest rate of 6 percent to be repaid over 29 years (IDA 1973). In an effort to build on the successful expansion of water production and water networks (IDA 1961a; IDA 1961b), this program prioritized network leakages, inaccurate meters, and inefficient billing and collection practices (IDA 1973). The IDA provided consultants to support AWSA officials in the establishment of a leak detection and repair office, the implementation of a household survey to detect illegal connections, and to reorganize the billing and collection systems (IDA 1973). Additionally water prices increased to 0.75 Jordan Dinars per cubic meter, and for the first time customers were required to pay connection fees and user charges for the sewerage system (IDA 1973).²⁴

The IDA commended AWSA's improved operational and managerial performance and expansion of water networks. AWSA's billing reforms and meter replacement programs helped reduce non-revenue water loss by 1976, though it still remained high at 41 percent (IDA 1978). Nevertheless, AWSA continued to struggle financially as operational costs increased due to rising electricity prices (IDA 1978). Additionally, the loss of cross-subsidies from the Amman Municipality and rapidly

²³ The project's goals included: a) extend piped water supply and sewerage services to all parts of the project area; b) reduce the percentage of water loss; and c) develop AWSA as a viable entity responsible for Amman's water supply and sewerage system (IDA 1973).

²⁴ There were fears that the costs could have detrimental impacts on per capita consumption, which was already low at about 35 liters per capita in the urban areas and 12 liters per capita in the refugee camps (IDA 1973), well below the recommended volume of water for basic health and sanitation of 50 liters per capita per day (Gleick 1996).

accruing debts from the IDA loans compounded AWSA's financial crisis. Ultimately, the IDA recommendations and loan conditions set into motion a cycle of debt-finance agreements that weighed heavily on AWSA's capacity for revenue generation despite improvements in the rates of water loss and higher prices. Low revenues and debt-financing agreements weakened AWSA's financial stability and impeded its capacity to maintain water networks. This set the stage for further water management reform projects in the late 1970s and 1980s.

AWSA, Water Supplies and Continued Reforms in the Late 1970s – 1980s

By the late 1970s, political and institutional constraints stemming from regime security, development policies, and donor conditions began to express themselves in various dimensions of municipal and national water management. In particular, the government used civil service employment to quiet public discontent but failed to attract the best individuals as regional economic growth attracted educated engineers to better-paying jobs in the Gulf. AWSA, on the other hand, was subject to stringent civil service codes that forced it to retain low-quality staff at high salaries (IDA 1978). Water scarcity also emerged as a critical barrier to competing state development policies in the Jordan Valley and water sector development in Amman. Authorities struggled to meet increased demand for water due to rapid population growth as Amman's water supplies were already fully developed (IDA 1978).

Population growth overextended AWSA. Between 1966 and 1976, Amman experienced an annual growth rate of 11 percent, as compared to 3.5 percent annual growth rate in the rest of Jordan (IDA 1978). The challenge presented by population

growth, however, was not the increased demand. Amman's population growth meant that AWSA had to finance the expansion and rehabilitation of Amman's municipal water networks. Despite significant extensions to the water supply and sewerage networks in 1960s and the first half of the 1970s, 20 percent of households remained without access to formal connections (IDA 1978).²⁵ Consequently, Jordan and the IDA reached an agreement in 1978 for another loan to rehabilitate and expand AWSA's water networks.

Between 1978 and 1981, Jordan received \$14 million credit from the IDA, which was passed on to AWSA at an interest rate of 6 percent annually with a 25-year repayment period (IDA 1978).²⁶ This was the last proposed IDA project for Jordan because it had reached a level of economic development that made it creditworthy for Bank lending. The project allocated investments for increasing water supply production capacity and expanding water networks, and, for the first time, launching water transfers to Amman.²⁷ Officials proposed water transfers because supplies from the Qastal and Swaqa aquifers no longer fulfilled Amman's needs and the Amman-Zarqa groundwater basin showed early signs of over-exploitation and salinity (IDA 1978), which increased more than seven-fold between 1970 and 1998 (USAID 2007).

²⁵ More than 70 percent of households were not connected the sewage collection systems (IDA 1978).

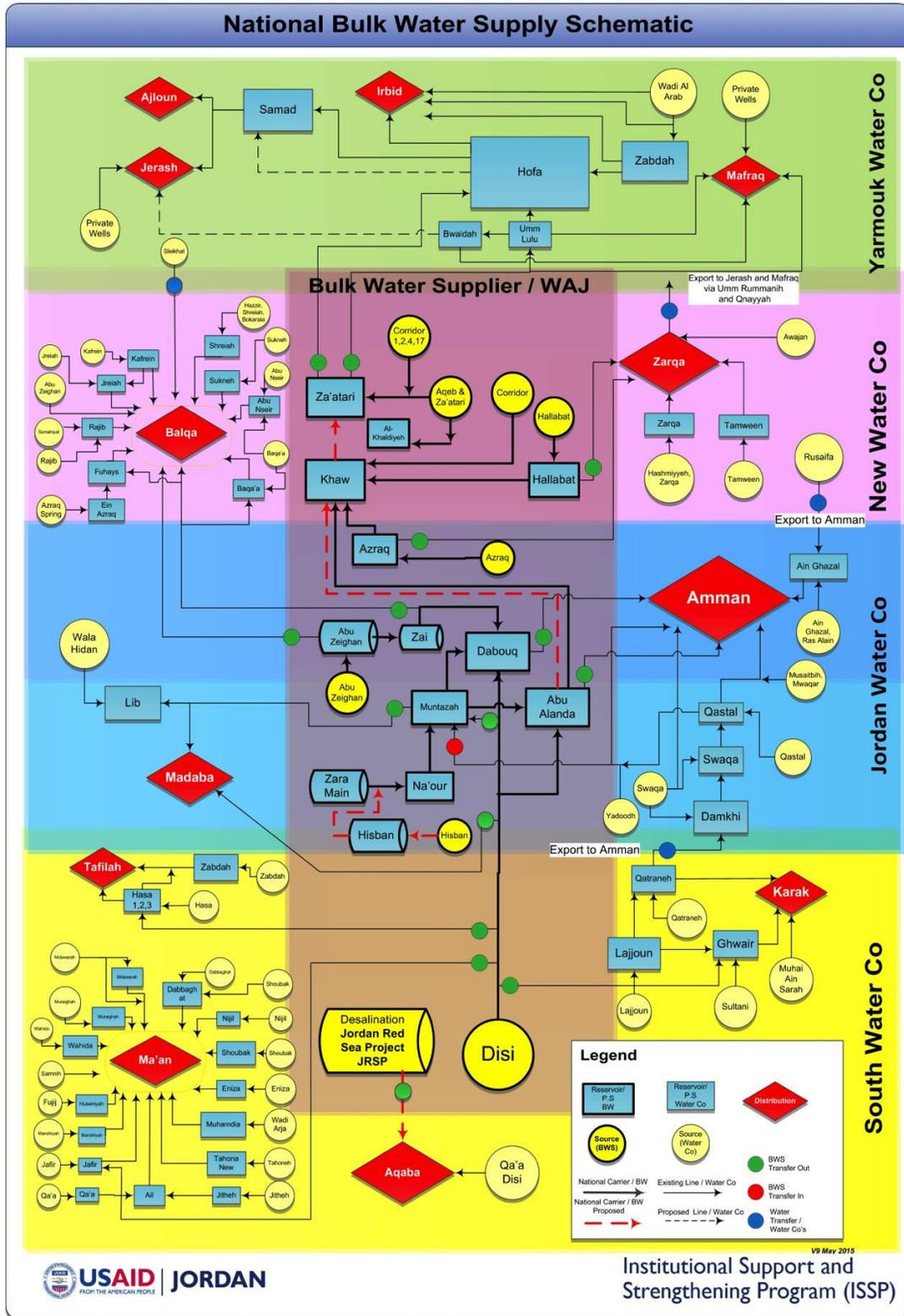
²⁶ The five objectives of the project were: a) construction of 207 kilometers of water mains, laterals and house connections, a 4,000 cubic meter reservoir, and one booster pumping station; b) construction for approximately 225 kilometers of sewerage mains, laterals, and house connections and two sewage lift stations; c) supply of 15,000 water meters, pipes, fittings, and relevant electrical and mechanical and maintenance equipment; d) consulting services for construction supervision; and e) staff training (IDA 1978, i).

²⁷ Water transfers in Jordan first began in the 1960s to its second largest city Irbid, which received water from the Dhuleil-Azraq aquifer (IDA 1978) through an abandoned oil pipeline from the Iraq Petroleum Company (Haddadin, Sunna', and Al Rashid 2006). More supplies to Irbid became necessary in the 1970s, resulting in additional transfers from the Aqib Aquifer in northern Jordan and in the late 1980s from the Jordan Valley (Haddadin 2006).

The IDA (1978) recommended water transfers from the Azraq Basin and the King Talal Dam reservoir. In the end, officials approved the Azraq project but abandoned plans to transfer water from King Talal Dam due to water quality problems (World Bank 1985). Water transfers from the Azraq Basin, which is about 100 kilometers east of Amman, began in 1980. It added an additional 15 million cubic meters to Amman's water supply, shifting municipal distribution from intermittent to continuous. However, the water transfers also produced one of Jordan's greatest environmental tragedies (Molle, Wester, and Hirsch 2010). It devastated the ecosystem of Azraq Oasis and wetlands, which hosted rare flocks of migratory birds and other wildlife, as water tables dropped by several meters in thirty years, increased water salinity by 77 percent in deep wells and 90 percent in shallow wells, and increased concentration of metals and solids (Daoud et al. 2006). Over time, water transfer schemes throughout Jordan grew increasingly complex. Figure 3.1 depicts Jordan's bulk current bulk water production and transfer arrangements. The middle sections in this figure represent the bulk water supply reservoirs, which collect water from various sources throughout the country and supply the middle and northern governorates.²⁸

²⁸ The bulk water schematic is divided by governorates and proposed water utility companies. The yellow circles represent well fields whereas the blue polygons indicate the presence of bulk water reservoirs. The small green and red circles represent the import and export points of the bulk water supplies. The case of Amman indicates that the majority of its drinking water supplies are derived from bulk water resources outside of the governorate.

Figure 3.1 Jordan's National Bulk Water Supply Schematic



Source: (USAID 2015)

The Azraq water transfer project was successful in ensuring more stable water supply in Amman and paved the way for subsequent transfers. Authorities devised plans to transfer an additional 45 million cubic meters of water from the King Abdallah Canal in the Jordan Valley to Deir Alla reservoir linking the Jordan Valley with Amman. The project, completed in 1987, was the first occurrence of surface water being used for municipal purposes. Prior to this project, surface waters were designated for irrigation (Haddadin 2006). In order to appease farmers, officials also transferred Amman's treated wastewaters back to the King Talal Dam for irrigation in the Jordan Valley (Haddadin 2006).

The water transfers from the Azraq Basin and the King Abdullah Canal represented a new phase in the national water sector's strategies and the relationship between Amman and the rest of Jordan. AWSA's revenue generating capacity, however, continued to suffer from high rates of non-revenue water loss, averaging 44 percent over the lifespan of the project (World Bank 1985). Though the proportion of the population receiving piped water increased from about 80 percent in 1977 to 98 percent in 1982 (World Bank 1985), continuous distribution of water accelerated network deterioration and increased water losses. As more consumers connected to the network, more water was pumped into the system, and more water was lost. AWSA also incurred higher energy bills because as more energy was required to circulate the water on a continuous basis.

The financial costs associated with these operational challenges reinforced the constraints impeding on AWSA's financial performance. Interest on previous IDA loans also consumed 28 percent of AWSA's budgets as compared to a projected plan of

spending 8 percent on debt servicing. Revenues were ten percent lower than projected, while governmental and other loans comprised of 77 percent of its total budget (World Bank 1985). This forced the central government to service part of AWSA's debt (World Bank 1985), raising questions about AWSA's financial and operational viability.

AWSA's poor performance compelled authorities to transfer responsibilities for Amman's municipal water services to the Jordan Valley Authority in 1982. One year later the Water Authority of Jordan (WAJ) was created to oversee planning, production, and management of water supplies and wastewater services for all of Jordan except the Jordan Valley (Haddadin 2006). WAJ replaced AWSA and the Domestic Water Supply Corporation (previously responsible for bulk water supply and sewerage systems outside of Amman) (Haddadin 2006) in a move to centrally coordinate the planning and execution of water sector projects nationally (World Bank 1984). WAJ assumed control over all municipal water services and the assets of the municipalities. This also meant that WAJ assumed all of AWSA's debts.²⁹

Thus, WAJ was forced to cope with institutionalized new tensions with the JVA and also address its dire financial conditions from its inception. Water transfers from the Jordan Valley remained a key source of debate between WAJ and the JVA. WAJ argued that sourcing Amman's water supplies from the Jordan Valley was necessary because of Amman's unprecedented population growth rates. The JVA, however, argued that poor

²⁹ Though WAJ was set up as an autonomous corporate body with financial and administrative independence, it was also subject to civil service and government procurement laws. Additionally, at the time, the President and Secretary General of WAJ, both politically appointed by the Council of Ministers, reported to the Prime Minister's office (Abu-Shams and Rabadi 2003a). This arrangement structurally ensured that the central government could leverage political influence over controversial issues in the water sector.

economic development in the Jordan Valley spurred high rates of urban migration to Amman and water transfers would increase domestic migration as agricultural development programs became deprioritized (Haddadin, Sunna', and Al Rashid 2006).

The political tensions with the JVA combined with the continued impacts of IDA donor conditions in ways that severely constrained WAJ's capacity to ensure continued production and distribution of water in Amman, make capital investments, and repay debts from the three IDA-financed credits. Simply increasing supplies, improving water networks, and reforming institutions did not reform or produce a healthy water sector. IDA debt financing agreements and decisions to reform municipal water institutions and their budgetary arrangements played an instrumental role in shaping the financial health of the Water Department, AWSA, and WAJ. Further, the political motives behind the development of the Jordan Valley and the decision to isolate Amman from the rest of the country ended up being institutionalized in a contentious arrangement between WAJ and the JVA. As such, the achievements of the IDA-financed projects must be juxtaposed against the challenging political and institutional constraints produced by state development priorities and donor conditions. These constraints did not disappear as responsibilities were transferred from the Water Department to AWSA, and then to WAJ. Rather, they evolved and became institutionalized in ways that undermined efforts to improve municipal water services.

Centralizing Water Management and the Eight Cities Project

It is no surprise that WAJ's operational and financial performance did not differ from the experiences of the Water Department and AWSA. Non-revenue water loss

remained high and supplies were noticeably declining. WAJ, however, also faced the challenge of ensuring water supplies for Amman as conditions throughout the country rapidly deteriorated. The World Bank again partnered with the Jordanian government in order to increase water supply production and improving WAJ's administrative capacity and streamlining operations throughout Jordan. Like the previous projects, this initiative produced less than desirable results.

The water sector's poor performance contrasted with Jordan's strong economic growth throughout the late 1970s and early 1980s. Jordan experienced high rates of foreign investment and an average annual economic growth rate of 10 percent over six years. Agricultural production, especially in the Jordan Valley, played an important role in Jordan's economy as regional demand for Jordanian produce also increased. Jordan's economy also benefited from remittances from the Gulf, which comprised nearly two-thirds of Jordan's GDP between 1976 and 1982. However, things worsened in the mid-1980s because of the Iran and Iraq war and recession in the Gulf. Foreign aid to Jordan declined by 25 percent, remittances stagnated, and export of agricultural products and manufactured goods to neighboring countries fell (Clausen 1986).

The rapidly changing economic conditions had strong implications for the water sector. The World Bank (World Bank 1986) noted,

The rapid growth of the economy in recent years and the associated increase in municipal, industrial, and agricultural water demands, coupled with Jordan's high rate of population increase, have put serious pressure on the country's limited water resource; and water scarcity may become a principal constraint to economic growth. In these circumstances, it is crucial for Jordan to realize the maximum benefits from its limited resources through continued development and implementation of a sound sector strategy and through prudent water resource management (1-2).

Jordan's ability to reinvigorate its economy required a strong water sector capable of managing scarce water supplies at high rates of efficiency. WAJ, however, faced

administrative challenges in its first years of operation. It had to standardize billing and operational procedures for all of the municipalities while also addressing high rates of water losses plaguing Jordan's major and secondary cities, averaging at 40-45 percent (World Bank 1984; World Bank 1985). Additionally, Jordan was experiencing a rapid decline of available water supplies, which led officials to caution that municipal and industrial demand for water may not be met without reductions in irrigation (Huang and Banerjee 1984). This was particularly alarming because of the strong role agriculture was playing in Jordan's economic development. In the 1981-1985 Five-Year Plan (1981-1985), the Jordanian government allocated 16 percent of public sector investments for the production of new water supplies, seven times higher than the previous plan (1976-1980) (World Bank 1986).

In light of these challenges, the World Bank agreed to finance a fourth project for \$30 million in 1984 (World Bank 1984)³⁰ for the rehabilitation of water supply networks and wastewater treatment services for eight cities in Jordan, including Amman.³¹ The project's goals included improving WAJ's: 1) data collection, monitoring, and evaluation practices, 2) debt-equity ratio, cost recovery, asset expansion and rehabilitation, and 3) managerial practices (World Bank 1984). The project stressed the importance of building capacity in WAJ in a context of water scarcity and limited economic development. This project helped WAJ make significant improvements in supply production, billing procedures, and infrastructural development. WAJ, however, was unable to cover its

³⁰ This loan carried an interest rate of 10 percent annually, to be repaid over 15 years. This loan was different than past loans in that it was variable, with a 0.75 percent charge on money that is not dispersed. Loans extended by German KfW and USAID were to be paid over 20 years after an initial 10-year grace period and carried an interest rate of 6 percent annually. All interest payments during the construction period were paid by the government and added to the debt of the Water Authority of Jordan (World Bank 1984).

³¹ The other cities included Mafraq, Ajloun, Anjara, Ein Janneh, Kufrinja, Madaba, and Ma'an.

operating costs due high rates of water loss, resistance to tariff reforms by authorities, and the government's failure to follow through on a promise to subsidize water tankers to small villages and rural communities (World Bank 1989).

The fact that WAJ could barely cover operating costs meant that it could not invest in the maintenance of water networks. Consequently, average rates of non-revenue water loss throughout the country increased from 38 percent in 1984 to 58 percent in 1987. The cause was partly administrative and operational. A study conducted in 1987 found that of the 59 percent of the non-revenue water loss in Amman, 21 percent was from water leaks and 38 percent from poor monitoring of water meters and billing practices (World Bank 1989). The setbacks in monitoring and registration of water meters was cause for concern as supplies increased by an average of 9.7 percent per year. Collectively, these factors undermined WAJ's debt servicing capacity, resulting in an overdue debt of 16.8 million Jordanian Dinars on principal and interest by 1989 (World Bank 1989).

WAJ's failure to improve conditions in Amman led to a fifth World Bank project in 1986. The project budgeted \$50 million for programs and capital investments in Amman, with 52 percent financed by the World Bank and the remainder covered by the government and consumer revenues. The loan was made to the government for 15 years at a variable interest rate. WAJ was subject to an interest rate of 5 percent annually to be repaid to the government. The project sought to create a long-term investment program for Amman's municipal water services that covered improvements for water resource management and reduction of water loss. It also financed the rehabilitation and extension of water distribution and sewage collection and water treatment (Clausen 1986).

The project's success, however, was again offset by WAJ's poor financial performance. Expenses outpaced revenues, and as a result the operating gap increased from 18 percent of operating revenues in 1986 to 100 percent by 1994 (World Bank 1995). Several factors drove the deficit increase. Firstly, there was a significant gap between water production costs and water prices, which were produced at an average cost of 0.6 Jordanian Dinars per cubic meter but sold at 0.3 Jordanian Dinars per cubic meter (World Bank 1995). Secondly, non-revenue water loss increased from 45 percent to 60 percent (World Bank 1995). The World Bank placed blame on higher rates of water losses on WAJ for its "...failure to incorporate water loss reduction as an *internal* and on-going program..." (World Bank 1995, iv) because WAJ failed to adequately train staff and monitor water distribution networks and water meters throughout Amman.

By 1988, it was clear that WAJ was incapable of overseeing strategic planning and operational responsibilities. In response, the Jordanian government created the Ministry of Water and Irrigation to coordinate water-planning strategies between WAJ and the Jordan Valley Authority. Removing planning responsibilities from WAJ, however, did not free it from its problems. Rather, it faced new challenges as ministry and WAJ officials worked to determine the separation of responsibilities, an issue that affects both institutions today. Additionally, debts incurred over the forty years and limited capacity to increase revenues and cover operational costs – let alone capital investment – threatened WAJ's long-term viability. In fact, authorities recommended financial restructuring and debt forgiveness in 1995 (World Bank 1995). Such recommendations, however, would be insufficient unless policymakers and donors reconsidered their approach. The evidence shows that institutional reforms, government

policies, and donor conditions since the 1960s were instrumental in producing the conditions underlying the management crises.

Conclusion

Jordan's water sector has been characterized by persistent crises because politically motivated government policies and donor conditions seriously shaped and constrained the national water sector and Amman's municipal water services. Early in the state building process, state officials fostered water sector development policies that were acutely attuned to legitimacy, regime security, and power, particularly in the Jordan Valley and Amman. Donor projects were subsequently implemented within this political context, ultimately producing, reinforcing, and transforming institutional and political constraints in water management. Together, government priorities and donor requirements shaped the trajectory of the water sector at the national and municipal level and the production of various economic, hydrological, and engineering crises. Over time, the constraints underlying the production of these water crises were merely reconfigured rather than transformed.

The development and evolution of state institutions and water management practices is context-dependent. Outcomes of institutional development and water management are contingent upon the local interactions of state priorities and donor conditions vis-à-vis strategic planning, management frameworks, infrastructure, and finance. In the case of Jordan, authorities faced difficult questions about how to balance agricultural and urban needs in times of political and humanitarian crisis. These shaped the state's priorities and provided a crucial, and highly influential, context for World

Bank projects. In tracking the history of institutional development and the World Bank's projects, it becomes clear that the issues of cost recovery, non-revenue water loss, infrastructure, and debt have been mainstay issues plaguing the water sector for over fifty years – indicating a systemic crisis internalized within the water sector.

Urban water scholarship argues that water management failures can take place even when engineering succeeds in increasing water supply and improving distribution (Bakker 2010). Indeed, this chapter affirms this argument. Scholarship about urban water management particularly in cities of the global South have provided important insight on how past policies underlie inequalities in access to water and poor infrastructure (Gandy 2006; Swyngedouw 2004). This literature, however, has not accounted for how contemporary municipal water crises are inherently linked to the historical evolution of urban water management and its relationship to state building processes. In closing this gap, the chapter provides a conceptual link for understanding why privatization programs have failed.

This chapter has demonstrated how the water sector's regulatory plane reflects the continual evolution of past constraints interacting with new conditions. Structural adjustment, deregulation, privatization, and commercialization have been implemented within these evolving contexts. It is thus important to examine, and understand, the origins and transformation of the politics and institutions underlying management failures. This historical context elucidates why the problems afflicting the water sector in the early 1960s carried into the 1990s, despite a markedly different political and economic context and water sector. It also provides crucial insight into the conditions and constraints shaping privatization programs since their onset in 1999. The next chapter

more thoroughly examines the contemporary contexts of these institutional and political constraints and how they have shaped the corporatization process in Jordan's municipal and national water services.

Chapter 4 Privatization in the Water Sector

Introduction

Analysts argue that corporatization of Jordan's water sector is necessary because management and governance conditions have failed to improve despite nearly four decades of capital investments and policy reforms (USAID 2011; World Bank 1999). Over the last fifteen years, three major initiatives have been introduced in order to inject private-sector participation and corporate frameworks into water management. In 1999, the Ministry of Water and Irrigation and the Water Authority of Jordan signed a management contract with Lyonnaise des Eaux – Montgomery Watson – Arabtech Jardaneh (LEMA) to introduce corporate governance in Amman's municipal water services. This was part of a more general trend of privatizing Jordanian public services, including the telecommunications and energy sectors (Tomaira 2008). In 2004 and 2007, limited liability companies assumed control of municipal water services in Aqaba and Amman and in 2011, Jordan and USAID launched the Institutional Support and Strengthening Project (ISSP) in an effort to expand the corporatization process to the national water sector. To date, the corporatization process has failed to accomplish its intended goals.

Academics and civil society groups argue that privatization programs, broadly speaking, fail to improve water management and services because of the poor regulatory environment within which they are implemented (Smith and Hanson 2003) and because companies prioritize profit over services and equity (von Schnitzler 2008; Loftus 2007; Loftus 2006b). Bakker (2010), however, argues that both public and private sector management failures express similar features and experiences. Despite her claim,

scholars have devoted little attention to the common experiences of public and private sector management failures. In other words, how are reforms influenced by the dynamics of underlying public sector failures?

This chapter builds on the arguments offered in Chapter Three and suggests that that Jordan's experiences with corporatization have been strongly shaped by the continued influence of institutional and political constraints endemic to the water sector. Further, the corporatization programs have introduced new governance conditions that have interacted with these constraints, producing differential experiences at the municipal and national levels and new tensions and challenges. The evidence for this argument is presented in three main sections. First, the chapter reviews the privatization programs and the links between them. Specifically, it discusses the LEMA management contract, the creation of limited liability companies in municipal water services, and the design and implementation of the ISSP. The second section discusses how the political and structural constraints have been produced and reinforced, and ultimately shaped, the outcomes of the corporatization process. Evidence for these sections come from key-informant interviews conducted in Amman, Jordan, in 2012 and analysis of published policy reports. The final section provides a brief summary of the chapter's findings and discussion of implications for scholarship about water governance in the context of privatization and related institutional reforms.

Privatization in the Water Sector

By the late 1990s, the Water Authority of Jordan did not reflect the desired outcomes from nearly forty years of World Bank financed reform projects. As a result,

the World Bank recommended that Jordan consider private sector participation. In 1997, Jordan unveiled a new water strategy that permitted the transfer of management of water services to the private sector, albeit with significant regulatory control by the government (World Bank 1999). This strategy paved the way for the LEMA management contract, the creation of limited liability companies, and later the ISSP. Until the ISSP, privatization in the water sector was restricted to municipal water services. The ISSP introduced an overall framework for corporate restructuring and institutional reforms at the municipal and national scale. The three initiatives – LEMA, limited liability companies, and ISSP – reflect the sector’s new trajectory towards corporatizing the water sector.

LEMA Management Contract and the Capital Investment Project

The LEMA management contract initiated the corporatization process in the water sector by introducing private sector management practices into Amman’s municipal water services. The Capital Investment Project (CIP), a major infrastructure rehabilitation and reform program for Amman’s water network intended to facilitate the continuous delivery of water, accompanied the management contract.¹ The CIP and the LEMA management contract represented a remarkable shift in the history of Amman’s municipal water services, albeit to a limited extent. Though LEMA was responsible for managing Amman’s municipal water services, WAJ oversaw the contractor’s performance and managed its budgets, investments, and water supplies. This set a critical precedent of continued government control over the corporatization of municipal water services.

¹ LEMA was not responsible for overseeing the CIP but it directly benefited from its implementation.

The LEMA management contract was financed by a \$55 million loan agreement with the World Bank under the Amman Water and Sanitation Project. The World Bank required Jordan to sign a contract with a private company for four-years for three reasons. First, Jordan struggled to provide financially efficient and effective management and services despite nine World Bank-financed projects. Second, it was believed that a private operator with extensive experience would rapidly improve performance and efficiency. Third, the private sector could provide performance incentives for employees and improve hiring practices outside of Jordan's civil service laws, and facilitate quicker procurement of needed capital investments (World Bank 1999).

World Bank financing of the management contract was contingent upon a series of concessions and performance requirements by LEMA and the central government with respect to services, budget management, and employment. Jordan was required to create and support a Performance Monitoring Unit (PMU) to provide institutional oversight over the management contract. The government was also expected to revise tariffs in order to improve cost recovery, as detailed in its 1997 Water Utility Policy (World Bank 1999). WAJ was also expected to improve operational capacity and financial viability by improving monitoring of water and wastewater networks and to develop a robust information system to better track leaks, repairs, and accounts receivables. Last, Jordan was required to commit to private-sector participation or corporatization by submitting a proposal to the World Bank for the post-LEMA phase at least twelve months before the expiration of the contract (World Bank 1999). The World Bank also accepted several governmental stipulations to the contract. WAJ retained control over LEMA's accounts, tariffs, and ownership over Amman's water infrastructure, which appeased Jordanian

desires for oversight over LEMA's performance and contract renewal decisions (World Bank 1999).

LEMA's financing, on the other hand, was contingent upon its progress in updating the billing system, training staff, improving efficiency, and reducing non-revenue water loss. Together, the PMU and the World Bank monitored LEMA's progress based on several performance indicators. First, it was expected to develop a framework for identifying investment needs and making investment decisions and implementation more efficient. Second, LEMA was expected to reduce non-revenue water loss and increase the number of hours of water delivery. Third, it was expected to lead a major initiative to replace and repair water meters throughout Amman. Last, LEMA was expected to improve efficiency standards in municipal water services through reductions in the number of staff, reducing energy requirements, improving customer services (World Bank 1999).

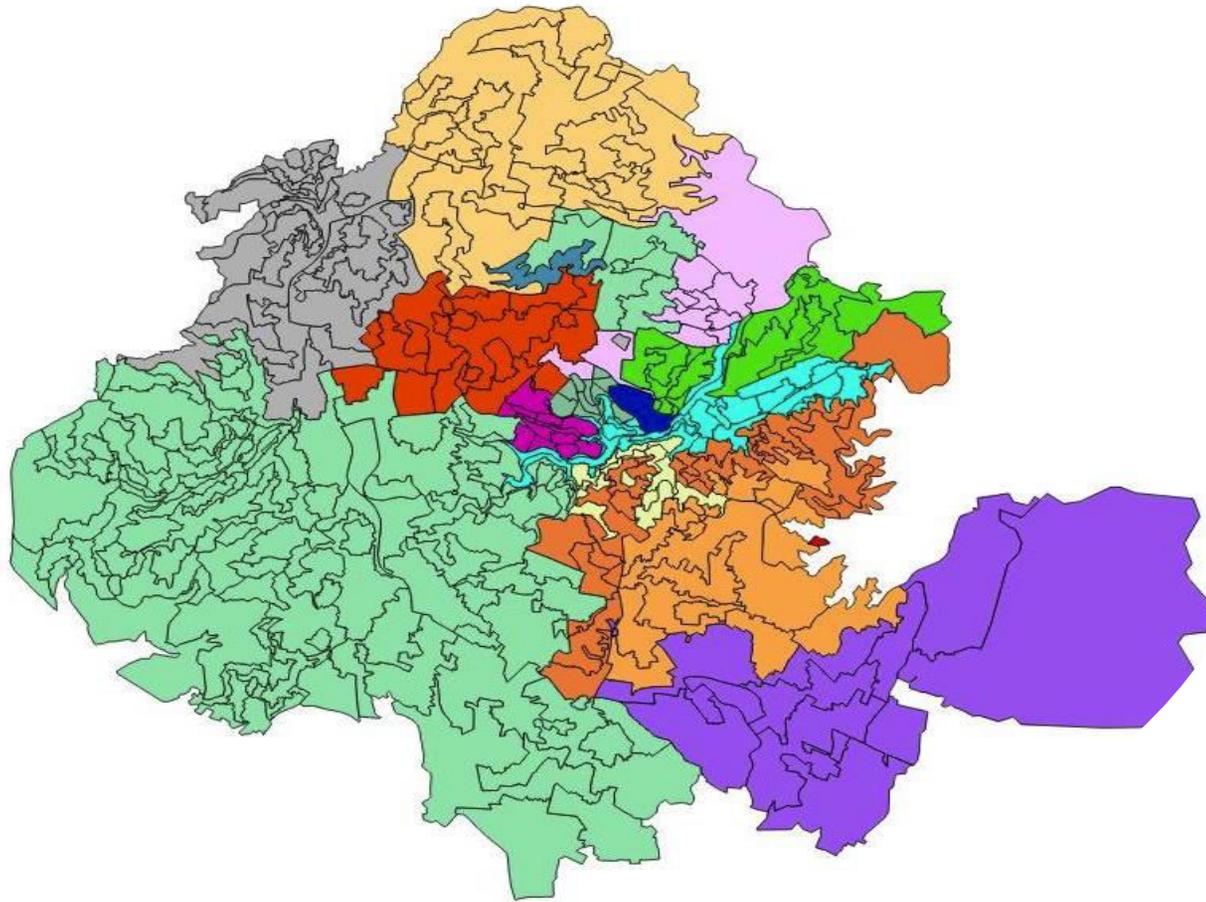
The CIP accompanied the reorientation of municipal water management towards private-sector practices in order to systematize water distribution and reduce non-revenue water loss, which remained high – 52 percent in 1999 (World Bank 1999). Amman's water networks were revised such that the city was divided into fifteen distribution zones that further divide into 314 distribution sub-districts. Map 4.1 map shows the fifteen districts and the sub-districts. Each distribution zone contains sub-districts that hold an equal number of customers (Policymaker Three 2012). Sixty underground tanks with a storage capacity of 626,200 cubic meters were installed throughout the city and twelve water towers with a storage capacity of 6,611 cubic meters were built in higher elevations. Additionally, 26 booster stations were installed to circulate water from

primary to secondary and tertiary lines, for a total operational capacity of 6,611 cubic meters per hour (Jordan Water Company 2007b). Seventeen main pumping stations with 84 serviceable pumps and twelve water supply stations service the network (Jordan Water Company 2007a). Amman's eastern and southern districts receive water from the Zai Reservoir while the western districts of the Capital are supplied from the Dabouq reservoir through gravity-based pumping supplies (Jordan Water Company 2007b).² Under the intermittent distribution system, each sub-district receives unlimited volumes of water for 24 to 48 hours on a fixed weekly rotation. Households, therefore, are required to install and maintain storage tanks for weekly water use and can use unlimited amounts of water on days of water delivery.³ The rationale for this infrastructural revision was improving distribution of water resources, billing, and non-revenue water loss.

² A wastewater system was also rehabilitated to collect from the residential areas to the treatment stations in Abu Nseir and Wadi Essir, or sent to Baqaa or Fuheis stations to be sent to Al-Khirbit Al-Samra' treatment station privately operated under a BOT contract (Jordan Water Company 2007b). The As-Samra treatment plant services approximately 45 percent of Jordan's population. In order to update the facility and build a pre-treatment plant, another BOT was negotiated in 2003 (Haddadin 2006).

³ The impacts of intermittent deliveries are examined in further detail in Chapter Five.

Map 4.1 Jordan Water Company Distribution Zones and Sub-Districts



Source: Map Produced by Basil Mahayni, Data Source Jordan Water Company – Miyahuna 2012

The combination of management reforms and infrastructural rehabilitation significantly improved Amman's municipal water services. LEMA successfully upgraded customer services, increased efficiency in operations, replaced several hundred thousand water meters, improved billing operations, and expanded hours of water delivery (Gomez 2009). LEMA's progress was based on two particular factors: 1) Jordan granted LEMA full possession – not ownership – of infrastructure during the scope of the project and 2) the CIP critically subsidized needed repairs in the municipal water network. LEMA's possession of the network allowed it to autonomously address problems related to water distribution, network monitoring, meter repairs, and billing. The CIP facilitated this by allowing LEMA to concentrate its budgets on these initiatives without needing to worry about financing major capital investments in network repairs. Though Jordan retained control over tariffs throughout the duration of the contract, LEMA's profit margins increased from 3.7 percent to 16.4 percent between 2001 and 2004, in large part because the CIP helped reduced non-revenue water loss (SEGURA/IP3 2006).

In 2004, Jordanian authorities agreed to extend LEMA's contract another three years in preparation for the next phase of municipal water management. With support from USAID, Jordan hired SEGURA/IP3 Consulting to explore management options for the post-LEMA period. The agency considered a wide variety of public sector control, private sector management, leasing, contracting, and participation, and the creation of publicly and privately held water utility companies (SEGURA/IP3 2006). SEGURA/IP3 ultimately recommended that a private shareholding company be in charge of all aspects of the water distribution and wastewater collection services.

The company was designed on the organizational structure created under the LEMA contract. The proposed company, however, differed from LEMA's contract in two critical ways. First, the proposal allocated control over revenues to the company to ensure financial sustainability. This would allow the company to dedicate revenues from operations according to operational, maintenance, and investment requirements. Second, SEGURA/IP3 recommended that the company be legally independent with full ownership over its assets (SEGURA/IP3 2006). In January 2006, authorities considered their options and ultimately decided on creating a limited liability company to replace LEMA and oversee Amman's municipal water services.

Limited Liability Companies: Jordan Water Company - Miyahuna

In January 2007, Jordan Water Company - Miyahuna assumed control over Amman's municipal water services. As a limited liability company, the creation of Miyahuna was another step towards comprehensive corporatization in municipal water management within state control. Against the recommendation of SEGURA/IP3, Miyahuna is wholly owned and regulated by WAJ. Jordanian authorities rejected outright privatization and management contracts because the limited liability company option allowed the government to retain control over municipal water services (Gomez 2009).

Alternatives to the limited liability model were considered to be unfeasible by Jordanian authorities. Renewing LEMA's contract was not an attractive option because both LEMA and WAJ had already performed to capacity with respect to water losses and water supply provisions. A contract extension would require LEMA to significantly reduce rates of non-revenue water loss and increase hours of distribution under a new

contract. This, however, would require WAJ to guarantee increases in bulk water supplies (World Bank 2007), which was difficult considering that bulk water supplies were already at peak volumes (Gomez 2009; World Bank 2007). Consultants also cautioned against concession and leasing models in lieu of a private management contract. Consultants believed that Jordanian regulations would deter private sector participation and/or undermine the negotiated agreement (SEGURA/IP3 2006). Additionally, there were fears that contractors would provide excessively high prices because of an inadequate tariff model (Gomez 2009). Naturally, restoration of WAJ control over Amman's municipal water services was out of the question due to the World Bank's requirement that Jordan commit to corporatization in the water sector (World Bank 2007). Consequently, the limited liability model reflected compromise as it advanced corporatization under the purview of state control.

The limited liability option, however, seemed pre-determined among influential policymakers (Gomez 2009). Authorities based their decision to pursue a limited liability model in Amman on the success of the Aqaba Water Company, which was launched in 2004. The Aqaba Water Company was formed as part of the development of the Aqaba Special Economic Zone, which was created in 2000. The Aqaba Special Economic Zone Authority (ASEZA) argued that improved water and wastewater services were necessary for development. ASEZA, which is legally responsible for developing utilities inside the zone, leveraged their political weight and convinced government authorities that a corporate model was preferable to WAJ (Gomez 2009).¹ By this stage, government authorities had already expressed support for corporatization of public utilities in their

¹ Despite the Aqaba Special Economic Zone Authority's legal responsibility for developing utilities, all policy choices required approval of the Council of Ministers

commitments to the World Bank, and as such, the Council of Ministers approved the creation of the Aqaba Water Company.

The Aqaba Water Company is jointly owned by WAJ (85 percent) and the Aqaba Special Economic Zone Authority (15 percent) (Gomez 2009). As the majority shareholder, WAJ controls the general assembly, which is the company's highest authority. WAJ also controls the board of directors, which is appointed by the general assembly. Of the seven members on the board, five are appointed by WAJ whereas the Aqaba Special Economic Zone Authority appoints two. Financially, the water company holds financial autonomy for day-to-day decisions but WAJ holds control over strategic financial decisions. Operationally, Aqaba Water Company signed an agreement for fixed volumes of bulk water supplies with WAJ, though it is free to use its water resources according to company and municipal needs (Gomez 2009).

Many of the Aqaba Water Company's institutional arrangements were passed onto Miyahuna, some of which failed to heed the SEGURA/IP3 recommendations (SEGURA/IP3 2006). Rather than being a private-share holding company with full financial autonomy, Miyahuna is 100 percent owned by WAJ and regulated by WAJ. This means that WAJ controls Miyahuna's general assembly and also has control over nomination and selection of the Board of Directors, which select – and can dismiss – general managers and executives (Gomez 2009). Similarly, WAJ and Miyahuna signed an assignment agreement that delineated responsibilities. WAJ retained control over major investment decisions and producing and regulating bulk water supplies in addition

to full ownership over assets of Amman's municipal water infrastructure.² Miyahuna, however, was granted responsibility for all operations and minor investments in water and wastewater services for the entire Amman Governorate on the condition that it coordinate investment plans and projects with relevant institutions (Jordan Water Company 2007a).

Under this model, authorities developed multi-year business strategy for the new company. As a corporate entity, Miyahuna's business plan includes six strategic initiatives: 1) providing leadership in the management of water scarcity, 2) establishing customer confidence, 3) meeting the demands of growth, 4) building planning and technical capability and capacity, 5) enhancing management capabilities, and 6) building business partnerships (Jordan Water Company 2007a). Miyahuna was charged with improving communications with customers by sharing company plans and programs, addressing issues of concerns, and educating the public on water conservation schemes. Miyahuna also launched an extensive branding campaign to its customers and embarked on several marketing campaigns to raise awareness about their private status in order to build consumer confidence. They held events in public schools, involved community organizations, and delivered Miyahuna brochures with household bills (Policymaker Seven 2013).

Since it commenced its operations in 2007, Miyahuna has demonstrated improvements by reducing rates of non-revenue water loss to 34.3 percent and increasing the average weekly hours of distribution to households to 38 hours. Customer service also

² A General Assembly and a Board of Directors, appointed by the General Assembly, lead the management structure of Miyahuna. The Board of Directors consists of representatives from the water sector, other ministries, and the private sector (Jordan Water Company 2007b).

improved, with 99.5 percent of all registered customers receiving a bill in 2010 (Jordan Water Company 2010). Service disconnections also decreased in large part because customers more consistently paid their bills. This success was attributed to public service campaigns in local newspapers and direct phone calls to households late on their payments (Policymaker Seven 2013). Miyahuna also coordinated with the Jordan Post Company to allow customers to settle their accounts at any postal station (Jordan Water Company 2010). Miyahuna's efforts have paid dividends for improving the perception of Amman's municipal water services. Customer satisfaction surveys conducted in 2011 and 2012 revealed high levels of satisfaction with Miyahuna's services (Policymaker Seven 2013).

Until 2011, however, the corporatization process was restricted to municipal water services in Amman and Aqaba. It was becoming clear, however, that without sector-wide reforms, the successes experienced in municipal water services would remain limited. As such, in 2011, USAID and Jordan launched the Institutional Support and Strengthening Project to deepen and expand the corporatization process from the municipal scale to the national water sector through a reconfiguration of institutional responsibilities and policies.

The Institutional Support and Strengthening Project

By the late 2000s, Jordan was suffering from the effects of a regional economic decline, an escalating refugee crisis, and intensifying water scarcity. These conditions reinforced the stark contrast between the performance of LEMA and the limited liability companies with WAJ's poor performance in municipal water services. In 2010, analysts

recommended that Jordan expand the corporatization process or face higher costs and risks in the water sector (USAID 2011). One year later, Jordan and USAID signed an agreement to implement the Institutional Support and Strengthening Project (ISSP) for the corporate restructuring of Jordan's water sector.

The project was designed as a five-year project, though USAID only committed to financing three years. The project was renewed for two more years in 2013 and 2014. The ISSP relies on a combination of international and local expertise in the pursuit of reforms at the municipal and national level. Two consulting companies were hired to work with the Jordanian government: International Resources Group (IRG), a subsidiary of Engility Corporation, and EcoConsult. IRG is an international consulting firm that specializes in policy reform and capacity building in water resources management. EcoConsult, which has played a prominent role in major sustainable development projects in Jordan, is IRG's local partner (Ryan et al. 2013). Together, IRG and EcoConsult partnered with the MWI, WAJ, and Miyahuna in pursuit of two goals pertaining to municipal water services: 1) sector restructuring and 2) water utility reform.³ Sector restructuring is based on three sub-goals of consolidating planning and management within the MWI, create a top-level National Water Council, and convert WAJ into a bulk water supplier and distributor. The water utility reform goals are to complete the process of corporatization, improve governance and management, and create an independent regulatory institution to oversee the corporatized utilities (USAID 2012).

³ The ISSP also focuses on building capacity within Water User Associations in the Jordan Valley.

Several reasons were provided for sector restructuring and water utility reform. First, ISSP officials noted that the overlapping mandates between the MWI and WAJ had stifled strategic and sector-wide planning and management. Second, there was an inherent conflict of interest in WAJ's bulk water supply responsibilities and ownership of the limited liability companies. Third, hidden and direct subsidies distorted the financial state of the water sector as cost recovery challenges affected operations at multiple levels. Fourth, the limited liability companies faced several institutional barriers that undermined their authority and management autonomy. Fifth, tariffs for bulk water supplies and consumers did not reflect the cost of production and sector-wide expenses. Last, the water sector suffered from strong political influence as government officials regularly intervened in water sector planning.

The ISSP addresses these problems through a combination of strategic reorganization, institutional reform, and capacity building at the national and municipal scale. With respect to the water utilities, authorities sought to deepen and expand the corporatization process in municipal water services by working limited liability company executives and employees to improve business-related practices and increase efficiency (Ryan et al. 2013). The long-term goal is to create a sound institutional basis for converting all remaining WAJ offices providing municipal water services into limited liability companies.⁴

The ISSP also seeks to re-regulate oversight of the limited liability companies by bolstering the Performance Management Unit's (PMU) regulatory capacity. The PMU, which was initially created to oversee the day-to-day operations of the LEMA

⁴ In 2011, a third limited liability company, the Yarmouk Water Company, was introduced in the north with support from the US government's Millennium Challenge Corporation (Policymaker Two 2012).

management contract, evolved into a monitoring institution providing performance valuations of the limited liability companies. The PMU, however, has no regulatory enforcement power. Additionally, because the PMU is a sub-institution within WAJ it is unable to address WAJ's conflict of interest as the owner and regulatory of the limited liability companies. Consequently, under the ISSP, the PMU is being shifted into the MWI and converted into the Water Utility Regulatory Unit. In doing so, the PMU will be the sole regulatory authority for the entire water sector, which will provide technical recommendations for water policies without political influence.

The national level reforms revised WAJ and MWI responsibilities in order to address WAJ's excessive operational and financial burden and the failure to clearly delineate and establish cooperation between the MWI and WAJ. Authorities are working to shift WAJ's responsibilities away from municipal water services in order to concentrate solely on bulk water supply production and distribution to the corporatized water utilities. Related, responsibility for national water strategy and planning is being concentrated within the MWI. Last, a National Water Council will synthesize stakeholder interests through a democratic forum in order to make recommendations to the Ministry of Water and Irrigation on management strategies and planning.

Ultimately, the ISSP attempts to place responsibility for municipal water services with the limited liability companies and reconfigure institutional mandates at the national scale in order to streamline and improve water governance through a corporate framework. The collective experience of the ISSP, however, has been less than satisfactory as reform has not progressed as planned (Ryan et al. 2013). Institutional and political constraints embedded in the design and operations of the municipal and national

water sector have differentially shaped perceived decision-making capacity, processes, and experiences for authorities involved in managing municipal and national water services.

Constraints to the Corporatization Process

Political and institutional constraints endemic to the water sector have differentially shaped the corporatization processes for municipal and national water sector authorities. In particular, Jordan's political dynamics, donor conditions, and rapidly changing domestic and regional contexts have affected reform conditions and possibilities. The corporatization processes taking place since 1999 introduced new governance conditions that interacted with already existing constraints affecting water management to the detriment of the ISSP programs. These constraints have differentially affected officials at the MWI, WAJ, and Miyahuna with respect to decision-making and capacity to adopt reform measures. Understanding the ISSP's stalled progress, therefore, requires clarifying how the context of pre-existing and evolving constraints has affected the implementation of the reform programs.

Political Constraints

The way Jordan's political system copes with and responds to domestic discontent and regional crises has significantly shaped the corporatization of the municipal and national water sector. Four particular constraints have affected the corporatization process. First, the Council of Ministers holds significant influence over Jordan's policymaking processes. Second, the minister of the MWI has played a critical role in shaping the direction and dynamics of the water sector's priorities. Third, fears of public

discontent have influenced the nature and direction of government policies, especially since the emergence of widespread protests throughout the region in 2011. Fourth, Jordan has been directly burdened by the region's political crises, particularly through refugee resettlement and reduced access to cheap energy. These constraints are interrelated and mutually reinforcing. Collectively, they increase the perceived risks in decision-making processes associated with the corporatization process specifically and the water sector more generally. Fears of controversy, according to the chairman of one of Jordan's most prominent engineering consulting firms, has undermined long-term development planning (Policymaker Sixteen 2013).

Indeed, the ISSP has been implemented at a time of greater expressions of public discontent with rising costs of living and limited employment opportunities driven by regional political crises. Since 2005, nearly 500,000 Iraqi refugees and 600,000 Syrians have registered with the United Nations High Commissioner for Refugees in Jordan (UNHCR 2013). It is estimated that there are several thousand more Syrians who are not registered. Approximately 80 percent of these refugees live in urban areas, which creates downward pressures on water services⁵ and employment opportunities while housing and food prices increase (MOPIC 2013). In response, Jordanians have taken to the streets with greater frequency, especially since 2011. For example, major protests erupted throughout the country in September 2012, with taxi drivers delivering an especially public strike in Amman, after the Council of Ministers approved the IMF's recommended price increases for 90-octane gasoline and diesel by 10 percent in order to reduce federal

⁵ Additionally, the Za'atari refugee camp, one of the largest in the world, rests on one of the only groundwater reservoirs that provides drinking water for the northern cities of Irbid, Mafraq, and Ramtha (Policymaker Six 2013).

deficits (Kadri and Kershner 2012). In reaction to the public outcry, King Abdullah halted the price hikes and ordered additional research.⁶ One month later, ongoing public discontent about the state of political affairs led to the king's dissolution of parliament and his appointment of a fourth prime minister in one year. In fact, between 2011 and 2013, King Abdullah dissolved his government five times (Zawahri 2012).

The principal source that binds these political constraints together is the institutionalization of regime protection through a federal law that requires the Council of Ministers to approve all major public policy reforms. The heads of Jordan's ministries comprise the Council of Ministers. All ministers are appointed by the king and are dismissed when the government is dissolved. The Council of Ministers' power over public policy reforms, and the king's political control over ministerial appointments produced a dynamic sensitive to widespread protests. This king's frequent dissolution of the government over the last several years has reinforced the Council's reluctance to adopt controversial policy decisions out of fear of creating a political crisis.

This political dynamic has directly impacted the water sector and the corporate restructuring process. In particular, the political sensitivity involved with the Council of Minister's has led to strong ministerial influence over the direction of the sector's priorities and policies. Consequently, frequent changes to ministerial appointments have created inconsistent visions and directions for water sector planning. Between 2009 and 2012, the Ministry of Water and Irrigation had five different ministers, each serving a few months to a year (Policymaker Twelve 2013; Zawahri 2012). This has delayed decision-

⁶ In November 2012, the new government reintroduced fuel price increases, increasing gasoline prices by 14 percent and cooking gas by 50 percent, along with direct cash transfers to qualifying low-income households (Rudoren 2012).

making processes and scuttled reform proposals (Zawahri 2012) because new ministers brought new priorities (Policymaker Twelve 2013) such as wastewater treatment, water supply production, or infrastructure rehabilitation (Policymaker Nine 2013).

The nature of ministerial involvement in the water sector is often dependent on individual personalities. For example, former minister of Water and Irrigation Muhammad Najjar thought it was necessary to be involved in WAJ and Miyahuna's day-to-day operations. After becoming Minister in 2009, he immediately revisited several policy decisions taken by his predecessor. He was particularly concerned about long-term plans for the Disi Water Conveyance Project and Miyahuna's preparedness to receive increased volumes of water. He commissioned a study about this issue shortly before he was dismissed. Six months later, Najjar was reappointed and discovered that his predecessor had not followed through on the study. He explained that this lack of continuity in ministerial decisions is why he felt it was necessary to intervene in the affairs of WAJ and Miyahuna (Policymaker Fourteen 2013).

This stands in direct contrast to the opinion of another former minister. Rather than being involved in day-to-day operations, this former minister focused on planning and strategies for the national water sector (Policymaker Ten 2013). Specifically, he argued that the minister should advocate for increased government funding for the water sector and securing Jordan's right to trans-boundary waters (Policymaker Ten 2013) rather than overseeing WAJ's operational responsibilities. One former Secretary General of WAJ shares the belief that the minister should avoid intervening in direct operations and management. This Secretary General was frustrated by the minister's direct involvement in WAJ's day-to-day operations, noting that he regularly contested her

decisions because she was “not a water person” and bypassed her in sector consultations despite the fact that she held the highest position within WAJ (Policymaker Six 2013).⁷

Direct ministerial involvement in the water sector and the Council of Ministers’ reluctance to take on controversy at a time of radically changing domestic economic and humanitarian conditions has stalled several aspects of the ISSP. In particular, the negotiations on a new water law that would institutionalize revised institutional responsibilities and tariff negotiations have been delayed indefinitely (Ryan et al. 2013). The failure to pass a new water law has negatively affected the ISSP’s efforts to address as the institutional overlap and mismanagement in the water sector. Under the existing water law, both the MWI and WAJ monitor surface and groundwater resources and grant licenses for well drilling with little coordination. The MWI is unable to coerce WAJ into cooperation because it was legally founded on a by-law rather than a dedicated law, meaning it as it has less legal control over the water sector than WAJ.

Similarly, the Council has refused to consider additional tariff reforms after it was revised in 2011. Under this revision, the number of tariff blocks was increased from four to seven. Yet, the tariffs remain highly subsidized, and the Council’s refusal to consider new reforms has affected the water sector’s ability to deal with rising operating costs driven by higher fuel prices after the Arab Gas Pipeline was destroyed during Egypt’s political crisis in 2011. Jordan, which imports approximately 90 percent of its energy needs, lost access to a critical source of cheap and clean natural gas. In response, the National Electric Power Company (NEPCO) resorted to producing electricity by burning crude oil, which is less efficient and more expensive (Policymaker One 2012). Both the

⁷ This former Secretary General was brought to WAJ in 2009 after a brief tenure with the Royal Court.

water law and the tariff revisions are central elements of the corporate restructuring process. As such, ISSP progress has been stunted by the institutionalization of regime security into Jordan's political system.

Regime security, therefore, plays a de facto role in policymaking through frequent changes to ministerial appointments and the Council of Ministers' refusal to negotiate controversial topics, such as a new water law or tariff reforms. This political influence over the water sector generally has been historically produced and reiterated over fifty years of state building initiatives and reforms, rendering the issue of regime security as an endemic and instrumental component of the water sector's managerial dynamics. This has had the effect of reinforcing the institutional constraints affecting the MWI, WAJ, and the limited liability companies, and in turn, shaped the outcomes of institutional restructuring and governance reforms. Reform programs were implemented in a context of non-cooperation and institutional tensions between the municipal and national water sectors. As such, this does not reflect a failure of the public sector management regimes or the limitations of the ISSP. Rather, it suggests the importance of attending to the ways that Jordan's institutions are designed and how they operate. Understanding how the institutional constraints shape management dynamics provides a deeper understanding for how and why corporatization process has proceeded and why it has failed to realize its intended goals. The next section provides a more detailed analysis of how the institutional constraints have interacted with the ISSP and the challenges that have arisen out of these interactions.

Institutional Constraints

The nature of Jordan's political system and the ways it responds to humanitarian crises and public pressure have mediated and reinforced institutional constraints affecting the water sector. Specifically, the water sector suffers from three interrelated and mutually reinforcing constraints. First, the limited liability companies are inherently designed and operate as partially corporatized entities, limiting their ability to respond to investment and operational challenges. Second, the partial corporatization of the limited liability companies is reinforced by the lack of an independent regulator, which is due to the fact that WAJ maintains sole ownership and regulatory control over of the utilities. Third, there is limited coordination between the MWI and WAJ due to an inadequate and outdated water law governing institutional responsibilities. The corporatization process has attempted to redress these institutional challenges through legal reform, sector restructuring, and water utility reform. Progress on these fronts, however, has been stifled by political influences, which have created institutional resistance to reform programs that reinforced challenges to water sector cooperation and coordination.

The partial corporatization of the limited liability companies has severely constrained their capacity to respond to rapidly changing operational contexts (Sommaripa 2011). Miyahuna currently generates enough revenue to cover operating costs, heightening worries about the lack of capital investments in the repair of primary, secondary, and tertiary water networks, which would help maintain low rates of water loss (Policymaker One 2012). Capital investments, however, have been deprioritized because operational expenditures have risen dramatically in recent years due to increased demand for water and rising energy costs. Jordan's refugee crises have played an

instrumental role in increasing operational expenditures. LEMA, for example, was initially expected to increase the hours of water distribution and reduce non-revenue water loss to 25 percent by the conclusion of the contract. After nearly 500,000 Iraqi refugees arrived in Jordan in the mid-2000s, however, LEMA's performance benchmarks for water distribution and non-revenue water loss were lowered (World Bank 2007). Miyahuna has faced similar challenges with the Syrian refugee crisis.⁸

Further, since 2011, Miyahuna has been forced to allocate a majority of its operational budget towards rapidly increasing energy costs (Humpal et al. 2012). Significant levels of electricity are required in order to distribute water throughout Amman, in which the highest and lowest elevations differ by 400 meters (Policymaker One 2012). This compounds an already expensive water supply production process. Before Amman's water reservoirs are filled, WAJ lifts bulk water supplies located in the Jordan Valley and near the Dead Sea, which are 470 meters below sea level, to 900 meters above sea level. WAJ also receives subsidized electricity prices to finance the energy requirements for producing and lifting water to higher elevations. Yet, the sector's deficits are so high that it has failed to pay its arrears to the National Electric Power Company (NEPCO). In July 2012, NEPCO shut off electricity to the MWI headquarters for several days due to an outstanding debt of 7 million Jordanian Dinars, forcing Minister Muhammad Najjar to appeal for a 50 million Jordanian Dinar loan (Namrouqa 2012a).

⁸ The impact of rising demand stems from the fact that there is greater consumption of water during the limited delivery periods. Bulk water supplies did not increase alongside the increase in demand, and thus the water sector was forced to ration municipal water distribution through reduced hours of delivery.

To date, the cost of producing bulk water supplies have not been transferred to Miyahuna as the Treasury covers the difference between WAJ's water production costs and the bulk water prices charged to the companies (USAID 2011). This direct subsidization of bulk water prices has ensured Miyahuna's financial solvency in the short-term despite the rapid increase in demand and energy costs (Humpal et al. 2012). There are fears, however, that Miyahuna will have to declare bankruptcy if its capacity to autonomously deal with budget deficits is not revised (Policymaker Twelve 2013). Doing so will require a revision to the regulatory frameworks that guide the corporatization of the limited liability companies.

Doing so requires changing WAJ's sole ownership, political control, and regulation of the companies. The root institutional cause of this partial corporatization stems from the regulatory frameworks that guide their creation, ownership, and oversight. The existing framework guiding the creation, ownership, and oversight of the companies, which prevents the full corporatization of the companies, can be traced to the Council of Ministers' insistence that WAJ retain asset ownership and control over finances in the LEMA management contract (World Bank 1999). Under this arrangement, all of LEMA's revenues were transferred into WAJ accounts. WAJ, on the other hand, dispersed money into LEMA accounts based upon pre-arranged financing agreements. All profits in excess of these financing agreements were transferred back to the central government (World Bank 2007). One consequence of this arrangement is that LEMA failed to improve its cash flow (Ryan et al. 2013) despite increased hours of delivery and reduced rates of water loss, a direct outcome of donor financed CIP (World Bank 2007).

This contracting arrangement with WAJ carried into the creation of the limited liability models (Ryan et al. 2013). In particular, Miyahuna's corporate framework is tied to, and restricted by, the assignment agreement with WAJ. Under this agreement, Miyahuna is responsible for minor investments, such as rehabilitation of water treatment plants, whereas major investments, such as network expansion, are the responsibility of WAJ. Miyahuna does not own its assets and all revenues in excess of operational costs are returned to the government under the National Surplus Law (Policymaker Twelve 2013). These two factors place Miyahuna in a precarious bind with respect to operational expenditures and capital investments.

As noted earlier, Miyahuna requires significant capital investments in order to ensure that water losses remain low. The company's ability to pursue capital investments are hampered by the assignment agreement's unclear definition on what constitutes major or minor investments (Policymaker Five 2013). Miyahuna's Planning and Investment Department manager noted that on several occasions WAJ rejected project proposals because of disagreements over whether the projects were minor or major investments (Policymaker Five 2013). Additionally, Miyahuna has been subjected to WAJ's unilateral revision of investment procedures. In its first few years of operations, Miyahuna was permitted to seek donor financing for minor investments but WAJ later reversed this decision and required Miyahuna to collaborate with the Ministry of Planning and International Cooperation (MOPIC), which is responsible for overseeing foreign assistance (Policymaker Five 2013). This further reduced Miyahuna's autonomy over its investment needs.

Miyahuna is also subject to ministerial influence over its operations. For example, between 2007 and 2011, Miyahuna collected household bills on a quarterly basis. In 2011 Minister Muhammad Najjar authorized a decision that required Miyahuna to collect monthly bills from its customers. Miyahuna, however, was not consulted on this decision or given advance notice. Miyahuna's operating costs increased substantially as they needed to recruit new tellers and meter readers and purchase additional cars. Several months after his decision, the minister reversed course after Miyahuna had already recruited and trained staff (Policymaker Five 2013).

The partial corporatization of the limited liability companies and WAJ's sustained control over municipal water services cannot be effectively resolved without addressing the issue of independent regulation and the sector's general disorganization. At the heart of this issue is the water law, which grants WAJ legal authority over the MWI (Policymaker Fifteen 2013).⁹ This means that WAJ technically delegates strategic management responsibilities to the MWI even though WAJ is supposed to report to the ministry (Policymaker Four 2012). The legal dynamic has produced overlapping responsibilities between WAJ and the MWI (Policymaker Six 2013).

One example of this overlap has been in the monitoring and regulation of surface and groundwater resources. Because of the nature of the water law, WAJ continues to build new wells without the knowledge of the MWI, while the MWI authorizes the production of new water supplies without consulting WAJ (Policymaker Twelve 2013). ISSP officials are trying to address this by consolidating surface and groundwater monitoring responsibilities in the MWI and converting WAJ into a bulk water supplier

⁹ WAJ was created through a dedicated law in 1983 whereas the MWI was created through a by-law in 1988.

through a new water law. This institutional revision, it is argued, will ensure the sustainability of Jordan water resources over the long-term (USAID 2011). Though WAJ has created a bulk water department, steps towards legally revising institutional responsibilities have been tabled by the governmental refusal to consider a new water law (Ryan et al. 2013).¹⁰

The lack of clearly defined responsibilities also affects tariff decisions. The water sector's long-term financial conditions would greatly benefit from revising bulk and municipal water budget models (Sommaripa 2011). WAJ and the MWI both have the authority to request tariff revisions from the Council of Ministers. Yet several ministers have cancelled tariff studies because they were considered misplaced or ill timed because of Jordan's delicate political climate (Ryan et al. 2013).¹¹ WAJ, on the other hand, has become reluctant to make recommendations about tariffs because they no longer see it as their priority or domain of work (Policymaker Twelve 2013). The failure of the MWI and WAJ to make a convincing case for tariff reforms, however, is not their fault. Rather, it stems from the nature of the water sector's evolution in which lack of institutional cooperation and continued political influence of Jordanian ministers over water sector planning and policies became endemic to the water sectors operational processes.

The constraints affecting the water utilities and institutional tensions highlight the need for independent regulators in the water sector. Independent regulators, it is argued, help ensure that authorities do not subject political influence over water policies and regulations. The senior regulatory advisor to the ISSP, stated,

¹⁰ Similar examples are found in the lack of WAJ's cooperation with the MWI's demand management programs (Policymaker Eleven 2013).

¹¹ In fact, the ISSP completed a new tariff regime, taking account ability to pay, but the Council of Ministers refused to take it into consideration (Ryan et al. 2013).

...the regulator's job is to try to keep it all as balanced as possible and to take it out of the hands of people that have the most gain from any decisions. So, the utility doesn't like the regulator because the regulator limits the return on investment that the utility can get. The customer doesn't like the regulator because tariffs go up. And the government doesn't like it because the government is not in-control of setting those prices, which pisses off the voters. But the government can't say, *we didn't do that. That's, the regulator, who did that. And the regulator is independent from us, so if you don't like it go throw tomatoes at him don't throw it at us.* So, that's where the regulator supposed to sit, and we always say, that if people like the regulator he's not doing his job properly. The idea is, the regulator should be powerful enough to be able to enforce its decisions. That means it has the power of the courts. I can take your license away, or I can remove your management, if you, the company, the utility, don't do what I tell you to do. And when I say, jump, the utility says, how high. And, do you want me to jump yesterday, or do you want me to jump today. 'cause I'll jump right this second (Policymaker Four 2012)

He noted, for example, that tariff decisions should be regulated by economic and not political considerations and that the independent regulator should have the authority to determine and impose tariffs. Decisions about how to subsidize poor households are political decisions that can involve cross-subsidization or direct cash transfers to families in need of assistance. These concerns, however, should not be the priority of the regulator (Policymaker Four 2012). The senior regulatory advisor also noted that regulators should be the sole institution responsible for granting operating licenses to water utilities and bulk water suppliers (Policymaker Four 2012). This also means that the regulator can cancel operating licenses for non-performance. For example, the regulator can levy penalty fees or cancel an operating license if it is unhappy with a water utility's performance. If the license is canceled, the regulator could decide on any number of arrangements, including wholesale transfer of all assets to a private company (Policymaker Four 2012).

The Performance Monitoring Unit (PMU), which is hosted within WAJ, is supposed to be the water sector's regulatory institution. The PMU was created as part of the LEMA management contract to oversee LEMA's day-to-day operations and the CIP. After the creation of the limited liability companies, the PMU's responsibilities shifted to

monitoring of WAJ and the limited liability companies on several Key Performance Indicators. In its current capacity, however, it can merely provide performance reports and recommendations. It does not have the authority to compel WAJ or the companies into compliance.

This severely undermines the PMU's intended regulatory responsibilities as recommendations or performance evaluations often go ignored. The director of the PMU noted,

...in terms of enforcement and ensuring an implementation of the recommendations, this is something which the PMU has been suffering from since the inception of the whole monitoring regime. So, for the last six years, nothing in that regard took place making sure that the utility basically complies with what they are required to comply with, even if they have breaches when it comes to certain parameters, certain issues. The only thing we are doing is recommending and then WAJ takes it on from there and we don't know what happens. There is no transparency basically after issuance of our monitoring report. Nothing is clear. No roles and responsibilities between the owner and the regulated entity and PMU is currently sitting in WAJ - it's not being or not able to push basically on these issues (Policymaker Eight 2013).

The source of the PMU's weakness is that it is hosted in WAJ. Consequently, the PMU has no regulatory authority over the PMU and also reinforces WAJ's conflict of interest as owner and regulator of the limited liability companies. The PMU, therefore, merely provides a cosmetic front with respect to monitoring and regulation within the water sector.

The strong role played by the Council of Ministers in managing Jordan's delicate political climate reinforces the PMU's limited capacity and stifled progress on converting the PMU into a legally independent and autonomous Water Utility Regulatory Unit (WURU). The PMU received very little support from the ministers because of confusion about the PMU's role and because of the frequent changes to the ministerial seat. The director of the PMU noted,

The PMU has suffered in my opinion. I only assumed the PMU last January, but from my understanding, they suffered from different ministerial changes. The PMU had the support of the minister, then comes a new minister and says “what is the PMU? What do they do? Why are they being paid higher salaries? Why? Why? Why? So everyone has their own mood and strategies. Nothing is institutionalized 100 percent (Policymaker Eight 2013)

The lack of institutionalization, and failure to convert the PMU into the WURU, stems from the fact that a new water law has not been agreed upon by the Council of Ministers (Policymaker Three 2012). Consequently, WAJ and MWI authorities agreed that the PMU would remain in WAJ but would report directly to the MWI until a law is passed (USAID 2014a).

Overall, the constraints affecting the water sector, and the corporatization process, have been institutionalized by a politically driven history of sector development and state building processes. The role played by the Council of Ministers in the water sector, however, is off limits to donors and the ISSP program. Consequently, consultants with the ISSP solicited an agreement from the government that ministers could not reverse decisions that are part of the corporate restructuring process. This, however, created an inconsistent reform process as several initiatives, such as WAJ’s conversion into a bulk water supplier and negotiations over a new water law, have been partially realized or suspended altogether. The inability to deal with politically sensitive issues affecting municipal and national water sector institutions reinforced the constraints plaguing the water sector and undermined the corporatization process.

Ultimately, the corporatization process has been significantly shaped by constraints endemic to the water sector. Most of these constraints, such as institutional overlap, predate the corporatization process whereas others were institutionalized following the initial privatization of Amman’s water services in 1999. These constraints

have stalled reforms in ways that do not necessarily reflect limitations with public sector or corporate management regimes. The ISSP could not address the deeply embedded structural and political constraints shaping the dynamics of the water sector at the national and municipal scales. However it has introduced new governance conditions that will, in the long-term, interact with continually evolving political and structural constraints that shape the sector's operational and management systems.

Conclusion

Jordan's privatization-related reforms over the past fifteen years have produced mixed results. These results, however, have little to do with the nature or adequacy of the reforms. Rather, the LEMA management contract, limited liability companies, and the ISSP represent a new phase in continuous reform and development in Jordan's national and municipal water services. The outcomes of fifty years of development projects in the water sector have interacted with the corporatization process to reinforce the effects of existing political and institutional constraints while also creating new challenges. Consequently, the debates over the merits of public and private management regimes in municipal and national water services should be reconsidered.

It is no coincidence that the World Bank required some form of privatization in its loan to Jordan in 1999. The World Bank had been requiring greater private sector participation for several years in funded projects throughout the global South because public sector management failures and extensive financial deficits. Even with extensive experiences and lessons learned from privatization programs throughout the world,

results continued to be mixed. Academics have strongly critiqued privatization programs arguing that they were undemocratically designed by financially-interested elites (Goldman 2007) in an effort to create new business opportunities for multinational companies (Swyngedouw 2005). Additionally, scholars note that the World Bank and International Monetary Fund played an instrumental role by coercing governmental deregulation of water sectors through donor conditions in exchange for key critical loans (Bakker 2010).

These arguments reiterate the notion that privatization represented a radical departure from public sector management. Indeed, the essence of privatization does differ from public sector management. What is missed in making this claim, however, is the fact that the political and institutional environments within which privatization programs are implemented are context dependent and, in turn, generate different outcomes. In some cases, privatization programs have succeeded where there are strong regulatory institutions (Smith 2004). The majority, however, have failed. Understanding these failures, however, requires assessing the nature of donor conditions and requirements and their interactions with institutional and political dynamics that shape a water sector's operational and managerial systems.

This chapter's argument elaborates Bakker's (2010) argument on why governance conditions matter for the outcomes of privatization and corporatization processes in municipal and national water services. She argues that analysts must attend to the effects of interactions of social, economic, and political institutions on management services in the formal and informal sectors. The limitation of this argument, however, is that it does not link governance conditions with the ongoing evolution of these institutions

historically. The case of Jordan suggests that the corporatization process has introduced new governance conditions that have interacted with the ongoing transformation of the water sector. Some of these constraints, like the institutional overlap between the MWI and WAJ, and the strong political influence of the ministers and Council of Ministers, significantly predate the corporatization process. Other constraints, like institutional models of the limited liability companies, are rooted in the introduction of privatization processes that began in 1999. Together, these have interacted to create an inflexible and politically sensitive water sector. It is thus important to pay attention to the way state institutions are created and transformed through water management and remade through reform projects. As argued in previous chapters, reform projects cannot presume clean slates in which new policies can be implemented.

These experiences with and outcomes of the reform programs also play a critical role in shaping household access to water and experiences with the water sector. Indeed, fears of public discontent have directly and indirectly shaped decision-making processes at the municipal and national level. The next chapter discusses how Jordanian and non-Jordanian households have perceived and experience the water reform process and service changes over the last fifteen years in Amman. Understanding these perspectives and experiences is critical as the corporatization process is unlikely to cease in the near future. In fact, the ISSP is set to end the fall of 2015 and indications are that USAID plans to implement a new round of reforms shortly thereafter.

Chapter 5 Privatization and Household Experiences

Introduction

The effects of privatization of water services on households have been framed in two contradictory ways.¹ Advocates of privatization, particularly the World Bank (1993), argue that such initiatives are pro-poor as reforms generate more efficient and effective distribution services. Social scientists, on the other hand, strongly critique privatization programs because poor consumers often face higher costs (Birdsall and Nellis 2003) and experience invasive measures that reduce their autonomy over water access and use (von Schnitzler 2008; Loftus 2006b). Both advocates and opponents of privatization share a common concern about the failure to provide efficient, effective, and equitable municipal water services. While some of the underlying causes of management failures in both public and private management regimes stem from political and institutional constraints affecting water services (see Chapters 3 and 4), additional research is needed into how households are affected by the interactions of privatization programs and the design of municipal water systems and services.

This chapter argues that in the case of Amman, the corporatized water utilities have improved municipal water services for households in terms of billing and consistent distribution. Despite such improvements, access inequalities persist because of the city's intermittent delivery system. The design of Amman's municipal water system requires households to store and ration water use each week because of a systematic intermittent delivery schedule. The design of this system, however, produces constraints to access,

¹ Privatization in this instance implies wholesale transfer of water services and infrastructure to private companies, private management contracts, corporatization and commercialization.

primarily affecting low-income households. The tariff revisions adopted in 2011 enhanced these inequalities as many low-income households were charged higher prices and consequently spend a greater share of their monthly income for municipal water bills. Households, however, are willing to pay higher prices so long as their barriers to access are addressed. It is thus important to consider how the infrastructural design of the water network, delivery schedules, billing, and modes of access to and storage of water collectively interact with household economic conditions. Without attending to the reality of household experiences with the municipal water services, a third pending tariff revision risks enhancing inequalities in water access and use.

This analysis uses two techniques to examine inequalities in access and distribution over the last decade. First, using Geographic Information Systems (GIS) software, Exploratory Spatial Data Analysis (ESDA) is conducted to understand temporal and spatial trends in water deliveries and consumption.² ESDA helps deduce the differences in water consumption in poorer east Amman and wealthier neighborhoods in west Amman. Second, extended interviews were conducted with families living in different parts of Amman. These households were selected through snow-ball sampling methods and reflect the different socio-economic strata of society, family size, and location. The interviews dealt with household perceptions and experiences with municipal water services and the corporate restructuring process.

This chapter is divided into several parts. First, it presents an explanation of ESDA methods and discusses the results of the Global Moran's *I*. The second part of the chapter examines the results of the ESDA through an analysis of household perceptions

² GeoDa, the software utilized for the ESDA, is an open-source GIS and spatial statistical program.

and experiences in the contexts of the services and reforms. Third, the chapter concludes with a synthesis of the research findings and contribution to academic scholarship.

Water Policies, Services, and Socio-Economic Inequalities

Amman is a city starkly divided along socio-economic lines. Unlike many water services in many cities of the global South (Gandy 2006; Swyngedouw 2004), however, 98 percent of all households have access to municipal water services (Potter and Darmame 2010). This achievement complements the Capital Investment Project's (CIP) rehabilitation of Amman's water network and its engineering into a gravity-based distribution system in the early 2000s.³ Initially, the CIP was designed for the continuous distribution of water throughout Amman⁴ as it was set to coincide with the completion of the Disi Water Conveyance Project. However, project delays in the Disi project forced officials to shift the design of the municipal water system for intermittent distribution (Policymaker Three 2012). As part of this process, the water networks were divided into fifteen districts and 344 sub-districts, which receive unlimited water one to two days per week. On these days, households are allowed to use and store as much water as possible (Abu-Shams and Rabadi 2003b).

Accompanying the CIP were initiatives designed to improve improving billing and customer services, particularly monitoring of household water meters and connections. One of LEMA's primary goals was to improve monitoring of household consumption for the purpose of improving billing procedures and reducing non-revenue

³ Prior to the project, households did not receive water on a continuous basis, but the water network was not engineered for intermittent distribution.

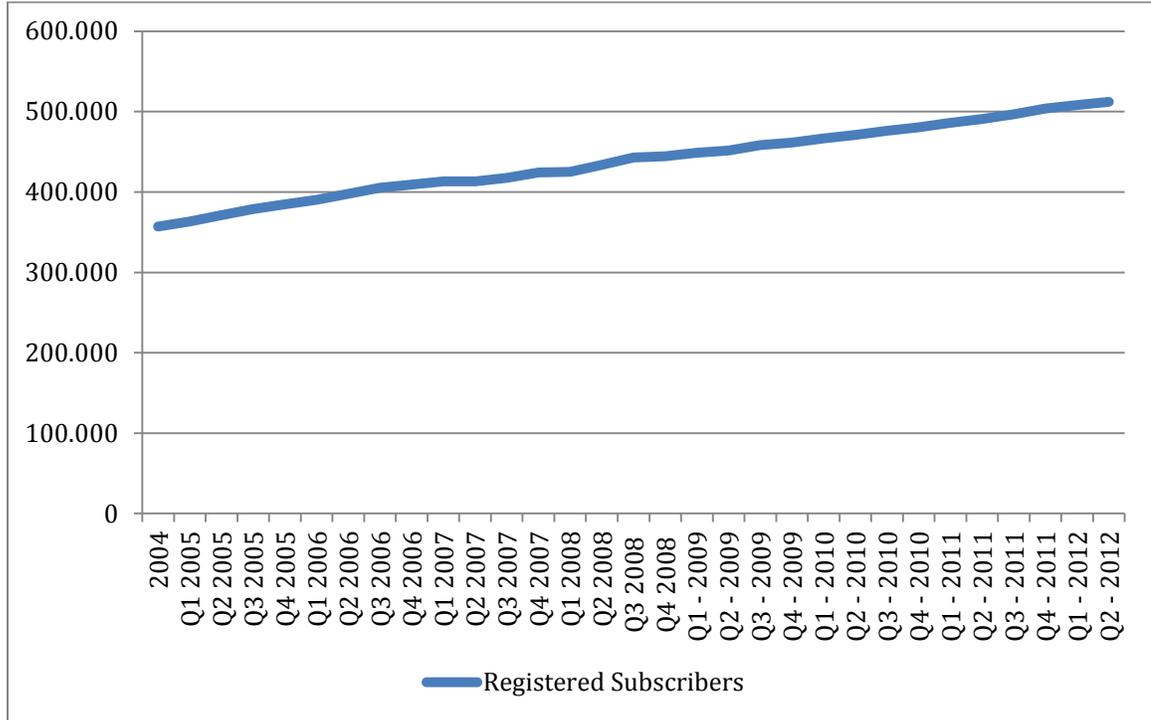
⁴ Benefits of continuous distribution include: 1) a reduction of operational costs by simplifying operations routines and an extension of the lives of pipes, valves, and water meters; 2) an improvement of the perception of municipal water services among its subscribers and a reduction of the likelihood of illicit connections or nonpayment of bills; and 3) an improvement of public health by eliminating negative pressures in water pipes that often suck in pollutants and debris into municipal water networks (Ray 2010).

water loss. Over the course of the management contract, LEMA replaced 250,000 water meters in nearly half of the 314 sub-districts. As a result, LEMA was able to reduce non-revenue water loss from 54 percent to 46 percent by 2006, with 150 out of the 314 sub-districts experiencing only 35 percent of non-revenue water loss due to upgrades to the network and water meters (World Bank 2007). Miyahuna has built on this progress by reducing non-revenue water loss to 35 percent for its entire network (USAID 2014b).⁵

Throughout the course of the CIP, the number of customers registered with LEMA and Miyahuna and total billed residential consumption increased significantly. The number of subscribers registered with Miyahuna steadily increased over the last decade from 357,185 in 2004 to 512,268 by 2012. Figure 5.1 highlights this increase between 2004 and 2007.

⁵ USAID/Jordan, however, is concerned about the possibility of significant increases in Amman's rates of non-revenue water loss due to the completion of the Disi Water Conveyance Project. Authorities estimate that rates of non-revenue water loss could increase from 35 percent to nearly 50 percent.

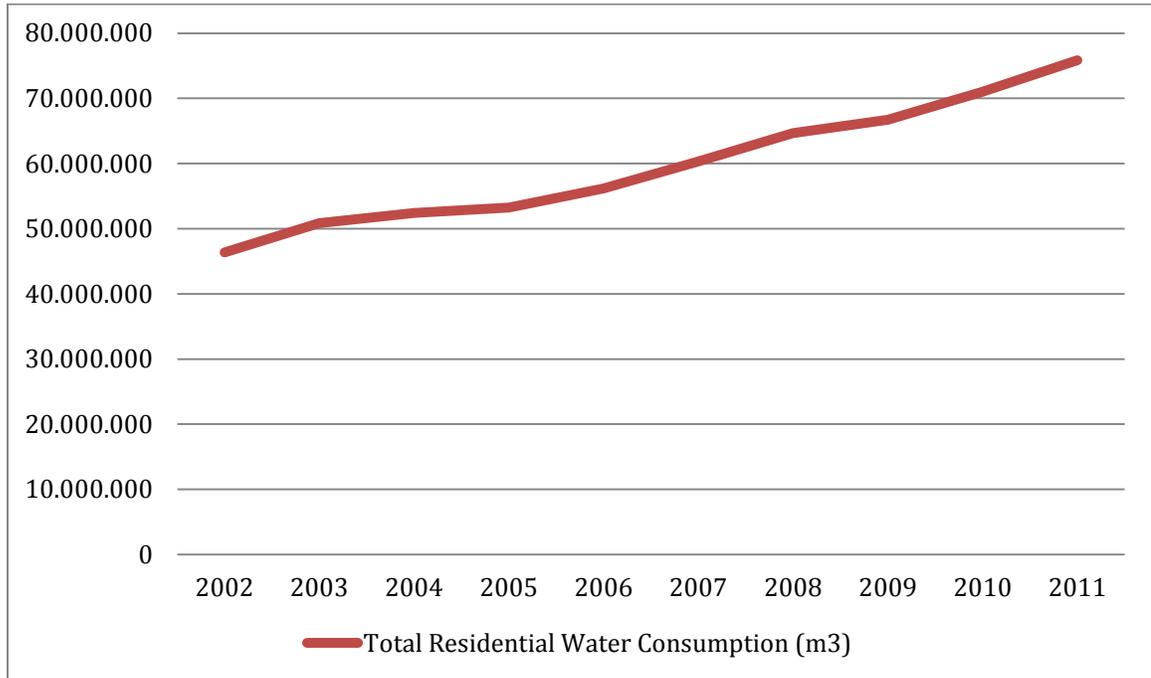
Figure 5.1 Number of Registered Subscribers



Source: Jordan Water Company - Miyahuna 2012

The growth in the number of customers stems from Amman’s rapid population growth in the mid to late 2000s. Starting in 2005, Amman started receiving several hundred thousand refugees from Iraq. Many of these refugees were middle income families opening new houses, and in some cases, leading to new urban developments in west Amman, particularly in the Deir Ghbar neighborhood. Improved monitoring of residential water meters ensured that LEMA and Miyahuna were able to more accurately bill customers for consumed water. This led to an increased in the billed residential water consumption, which increased from 46 million cubic meters in 2002 to 75 million cubic meters by 2011. Figure 5.2 illustrates this growth.

Figure 5.2 Total Residential Water Consumption



Source: Jordan Water Company - Miyahuna 2012

The increase in water consumption has remained heavily subsidized by direct and indirect subsidies for municipal water supply provisions sold to Miyahuna by WAJ. The water tariff was revised twice in 1997 and 2011. The 1997 tariff revision was implemented two years before LEMA's launch in order to disassociate increasing water prices with privatization (World Bank 2007). This tariff created four tiers for household bills, as represented in Table 5.1, and was calculated according to the following formula:

$$\text{Bill value} = \text{water charges} + \text{sewerage charges} + \text{meter fees} + \text{extra fees}$$

Table 5.1 Household Block Tariff One

Tier	Consumption range (m ³)	Water charges (JOD)	Sewerage charges (JOD)	Meter fees ¹ (JOD)	Extra fees ² (JOD)
1	0 - 20	2.000	0.672	0.300	2.150
2	21- 40	(0.14×volume) - 0.8	(0.0448×volume) - 0.224	0.300	4.150
3	41- 130	(0.006556×volume ²)- (0.12224×volume)	(0.003236×volume ²) - (0.084627×volume)	0.300	5.150
4	> 130	(0.85×volume)	(0.392×volume)	0.300	5.150

Source: Jordan Water Company – Miyahuna 2012

The bulk of the water bill in this tariff is derived from the volume of water consumed. Households that consume more water were expected to pay higher prices for each cubic meter. In 2011, the tariff revision added three more tiers, as represented in Table 5.2:

Table 5.2 Household Block Tariff Two

Tier	Quarterly Consumption range (m ³)	Fixed fee (JD)	Unit price of water (JD)	Unit price of sewerage (JD)	Factor
1	0 – 18	2.430	2.130*	0.600*	1
2	19 – 36	4.080	0.145	0.040	1
3	37 – 54	5.730	0.500	0.250	1
4	55 – 72	5.730	0.850	0.450	1.1
5	73 – 90	5.730	1.000	0.600	1.15
6	90 – 126	5.730	1.400	0.700	1.15
7	> 126	5.730	1.600	0.800	2

*Fixed amount not related to volume

Source: Jordan Water Company – Miyahuna 2012

This revision introduced greater price sensitivity for all consumers. Households in the first tier only pay a fixed fee. All water bills that fall in tiers 2-7 are based on the following formula:

$$\text{Bill value} = \text{Fixed fee} + [(\text{water unit price} + \text{sewerage unit service}) \times \text{consumed volume}] \times \text{factor}$$

In theory, the new tariff encourages conservation among high-end users while maintaining subsidization of poor households that consume limited amounts of water.

In light of the increasing water consumption and Miyahuna's rising operating expenses, ISSP, authorities hope to again revise the tariff in order to reduce the subsidies for municipal water supplies and increase Miyahuna's revenues (USAID 2011).⁶ Public policy experts also advocate for tariff reform because the current tariff subsidizes wealthier households, exposes low-income households to higher costs, and fails to encourage more sustainable water use (Najjar and Telfah 2012; Ray 2010). The tariff reforms, it is argued, will improve services, and in turn, encourage household willingness to pay higher prices (Policymaker One 2012).

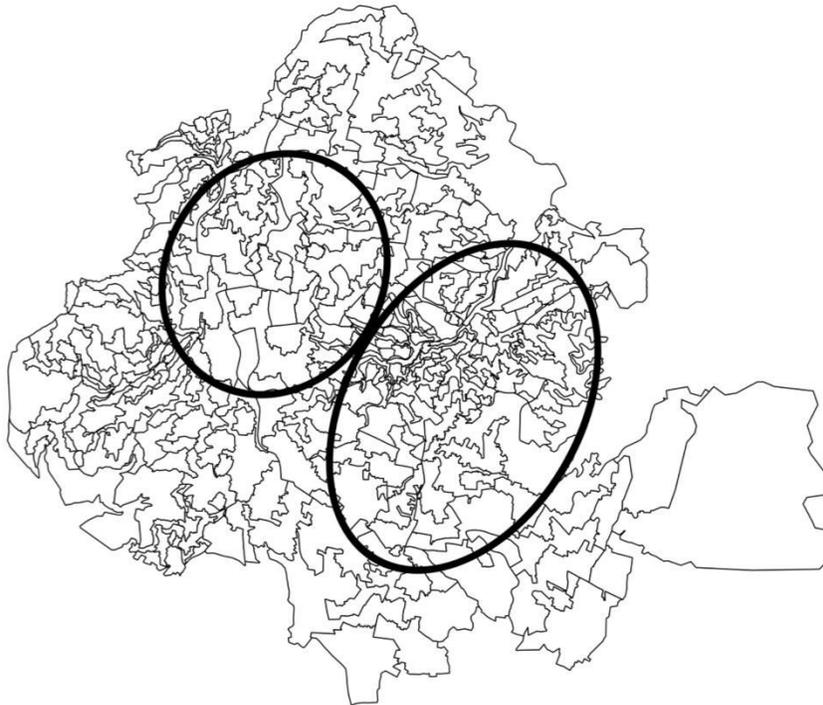
Collectively, the CIP, billing revisions, and the tariff modifications facilitated improvements from operational standpoints and the overall perception of Amman's municipal water services (USAID 2011). However, despite the equal availability of water to the 314 sub-districts, lower income households, which tend to be larger than wealthier households, still consume less water on average (Ray 2010).⁷ Wealthier residents typically reside in low-density neighborhoods in western parts of the city whereas lower-income households are located in high-density areas in the east. East and west Amman,

⁶ Economic reforms designed to enhance government capacity and reduce fiscal deficits have exacerbated household concerns. The International Monetary Fund recommended that the Jordanian government reconfigure public subsidies for energy and food (IMF 2012a). The reductions in energy subsidies have created significant problems for households in the last three years. Households rely on gas heaters and gas stoves for cooking. Between fall 2012 and fall 2014, one tank of natural gas increased from 6 Jordanian Dinars to 10 Jordanian Dinars. In the winter months, large families using two heaters could spend at least 80 Jordanian Dinars on heating. In 2013, the Jordanian government canceled the blanket subsidy on gas tanks and provided direct cash transfers to qualifying families, but the cash transfers did not cover the difference in the price increase of gas. Consequently, with the rising cost of living, few households are capable or willing to assume higher costs for water services.

⁷ The total volume of piped water generally declines in the summer months and increases in the winter, which translates into fewer hours of water delivery in the summer and more hours in the winter.

therefore, represent de facto geographical divisions in poverty and wealth. The reality of the geographical split is northwest to southeast, running through the center of the city, as depicted in Map 5.1. Subsequent references to east and west Amman in this chapter refer to these specific areas.

Map 5.1 East and West Amman



Map Produced by Basil Mahayni, Data Source Jordan Water Company – Miyahuna 2012

Existing research makes it clear that socio-economic inequalities appear in water access and consumption (Potter and Darmame 2010; Ray 2010). What remains unclear is how the intermittent delivery system and corporate restructuring process affect the production of these inequalities. Considering the stark socio-economic inequalities, how do an intermittent water delivery system and the current corporate restructuring project

shape inequalities and household experiences? Why is this so? These questions are examined using exploratory spatial data analysis (ESDA) and household interviews with residents of Amman.

Exploratory Spatial Data Analysis

The results of the ESDA reveals that there are tendencies of spatial clustering in the overall amount of water consumed and revenue generated in the 314 sub-districts but that there are few differences between average customer water consumption and average revenue generated per customer. It is important to note that customers billed are not the same as households. Customers have registered water meters with Miyahuna and receive quarterly bills. The difference between households and customers will be further discussed below. The discrepancy between the overall spatial clustering but little spatial clustering for average consumption and revenue generated can be addressed through ESDA (Anselin, Sridharan, and Gholston 2007), which provides insights about overall and local spatial clustering using the Global Moran's *I* and Local Indicators of Spatial Clustering (LISA) analyses. The Global Moran's *I* generates an overall measure of clustering whereas LISA highlights local areas of clustering in water consumption and revenue generated and for average customer consumption and revenue in each of the 314 sub-districts. Global Moran's *I* values range from -1 to 1, in which -1 indicates perfect dispersion and 1 indicates perfect clustering. A value of 0 indicates random distribution. It is important to note that Global Moran's *I* and LISA analyses are not predictive or determinative of statistical relationships between variables in space and time. Rather,

they merely provide a statistical snapshot of the degree of spatial clustering throughout Amman.

Global Moran's I

The Global Moran's *I* results reveal that there is spatial clustering in the overall levels of water consumption and revenue generated but little spatial clustering at the level of customers billed. The Global Moran's *I* is based on data provided by Miyahuna for each of the sub-districts, while customer averages were calculated by dividing the amount of water distributed and revenue generated by the number of customers billed. The results of the ESDA inform reflections on how the spatial clustering relates to, or reflect, socio-economic differences in the city. Using ESDA, the impacts of the LEMA management contract, CIP, and performance of Jordan Water Company – Miyahuna are tested through ESDA analyses of water distribution, customers billed, and revenue-generated data for each sub-district.

The statistical significance of the spatial clustering is based on a pseudo p-value generated by several hundred permutations of the Global Moran's *I* analysis. Statistical significance is indicated by p-values of .1, .05, .01, and .001. Lower p-values indicate a higher degree of statistical significance. Spatial weight matrices determine how space is factored into correlation calculations. Three types of spatial weight matrices can be used in tests of the Global Moran's *I*. First, the simple contiguity calculates spatial relations through vertices held in common between two areas. Second, rook spatial weights account for pure borders between polygons. Third, the queen spatial weight uses both

common vertices and pure borders. This analysis uses the queen spatial weight matrix because the sub-districts are not uniform in size or shape.

Miyahuna provided data for the ESDA analyses. The data set included the number of customers billed, revenue generated, and volume distributed for January and July in the years 2003, 2007, and 2011.⁸ These three years were selected because they provide insight into the impacts of the CIP, LEMA management contract, and Miyahuna on water distribution. The months of January and July were also selected to provide insights into seasonal differences in water consumption and delivery. Additionally, average customer consumption, revenue generated per customer, and average revenue per cubic meter were computed. These reflect average levels of consumption and average price per cubic meter of water paid by customers in each sub-district. This. Table 5.3 highlights the variables analyzed and how they were calculated:

Table 5.3 Variables used in GIS Analysis

Variable	Calculation
Customers Billed	Total Number of Customers Billed in each Sub-district
Cubic Meters Delivered	Total Volume of Water Delivered and Consumed in each Sub-district
Revenue	Total Revenue Generated in each Sub-district
Average Cubic Meter per Customer Billed	Cubic Meters Delivered / Customers Billed in each sub-district
Average Revenue per Customer Billed	Revenue / Customers Billed in each Sub-district
Average Revenue per Cubic Meter	Revenue / Cubic Meters Delivered in each Sub-district

The two sets of data can indicate if there are geographic differences in consumption, storage capacity, and monthly bills from an aggregated perspective and average customer for each sub-district. It is important to note that the water network sub-

⁸ Authorities at Miyahuna only consented to provide data from 2003 until May 2012 (Policymaker Nineteen 2012).

districts do not necessarily correlate to neighborhood sub-divisions, which are more neatly divided along socio-economic lines. The results of the Global Moran's *I* tests suggest that Amman's municipal water services demonstrate significant levels of spatial clustering in water consumption and revenue generated. The Global Moran's *I* results for the numbers of customers billed, cubic meters delivered, and revenue generated were statistically significant at p-values of .001. This means that there is spatial clustering in water consumption in the sub-districts. The results for the average customer, however, demonstrated weaker incidents of statistically significant spatial clustering. In other words, the data results suggest that average customers consumption is similar throughout Amman. Table 5.4 shows the results of the Global Moran's *I* tests for the six variables, by month, for 2003, 2007, and 2011.

The number of customers billed, revenue generated, and volume delivered in each of the 344 sub-districts all demonstrate highly significant levels ($p=.001$) of spatial clustering in January and July in 2003, 2007, and 2011. The average customer consumption and average revenue per customer, however, were not as statistically significant. The average customer consumption was significant in July 2003 ($p=.007$) and January 2007 ($p=.033$). The average revenue per customer billed was significant in January 2003 ($p=.081$), July 2003 ($p=.038$), January 2007 ($p=.003$), and July 2007 ($p=.004$). Average revenue per cubic meter showed statistically significant clustering for all three years, except July 2003. Only January 2011 was significant at $p=.001$.

Table 5.4 Global Moran's I Results

Variable	January 2003	July 2003	January 2007	July 2007	January 2011	July 2011
Customers Billed	.3440 p=.001	.2994 p=.001	.2699 p=.001	.2682 p=.001	.3135 p=.001	.3770 p=.001
Cubic Meters Delivered	.3210 p=.001	.3705 p=.001	.2736 p=.001	.2979 p=.001	.2993 p=.001	.3707 p=.001
Revenue	.4061 p=.001	.3395 p=.001	.2918 p=.001	.3305 p=.001	.2997 p=.001	.3825 p=.001
Average Cubic Meter per Customer Billed	.2792 p=.2792	.1073 p=.007	-.0787 p=.033	.1447 p=.791	-.0034 p=.8044	-.0032 p=.8280
Average Revenue per Customer Billed	.0379 p=.081	.0198 p=.038	-.2093 p=.003	.1571 p=.004	-.0039 p=.793	-.0039 p=.815
Average Revenue per Cubic Meter	.1403 p=.003	.0133 p=.187	.1189 p=.003	.0255 p=.041	.2076 p=.001	.0146 p=.075

Collectively, the spatial clustering in the total amount of water consumed and revenue generated in each sub-district raises questions about where these clusters are located. Local Indicators of Spatial Association (LISA) identify areas of spatial clustering (Anselin 1995). When high values are surrounded by similar values, the polygons are colored red. When low values are surrounded by other low values, the polygons are colored blue. Outliers are represented in pink and light blue, in which a high value is surrounded by low values, and vice-versa. The LISA maps are based on a queen spatial weight matrix and 999 permutations. The LISA maps visualize, at a statistical significance of .05, local clusters of sub-districts neighboring sub-districts with similar characteristics.

Maps 5.2-5.7 highlight the locations of spatial clusters for water consumption in each sub-district in January and July 2003, 2007, and 2011. Local clusters of high consumption are shown in red whereas clusters of low consumption are shown in blue. Maps 5.2 and 5.3 demonstrate strong incidents of spatial clustering of high consumption in west Amman. Maps 5.4 and 5.5 similarly show strong incidents of spatial clustering of high consumption in west Amman, albeit with a bit more dispersion. Maps 5.6 and 5.7 also show spatial clustering of high consumption in west Amman. The maps for water consumption in 2003, 2007, and 2011 do not indicate that there are concentrations of low volumes of water consumption in east Amman. Rather, the low volumes of water consumption are found in the outer suburbs of the city, which also happen to be more industrial rather than residential zones.

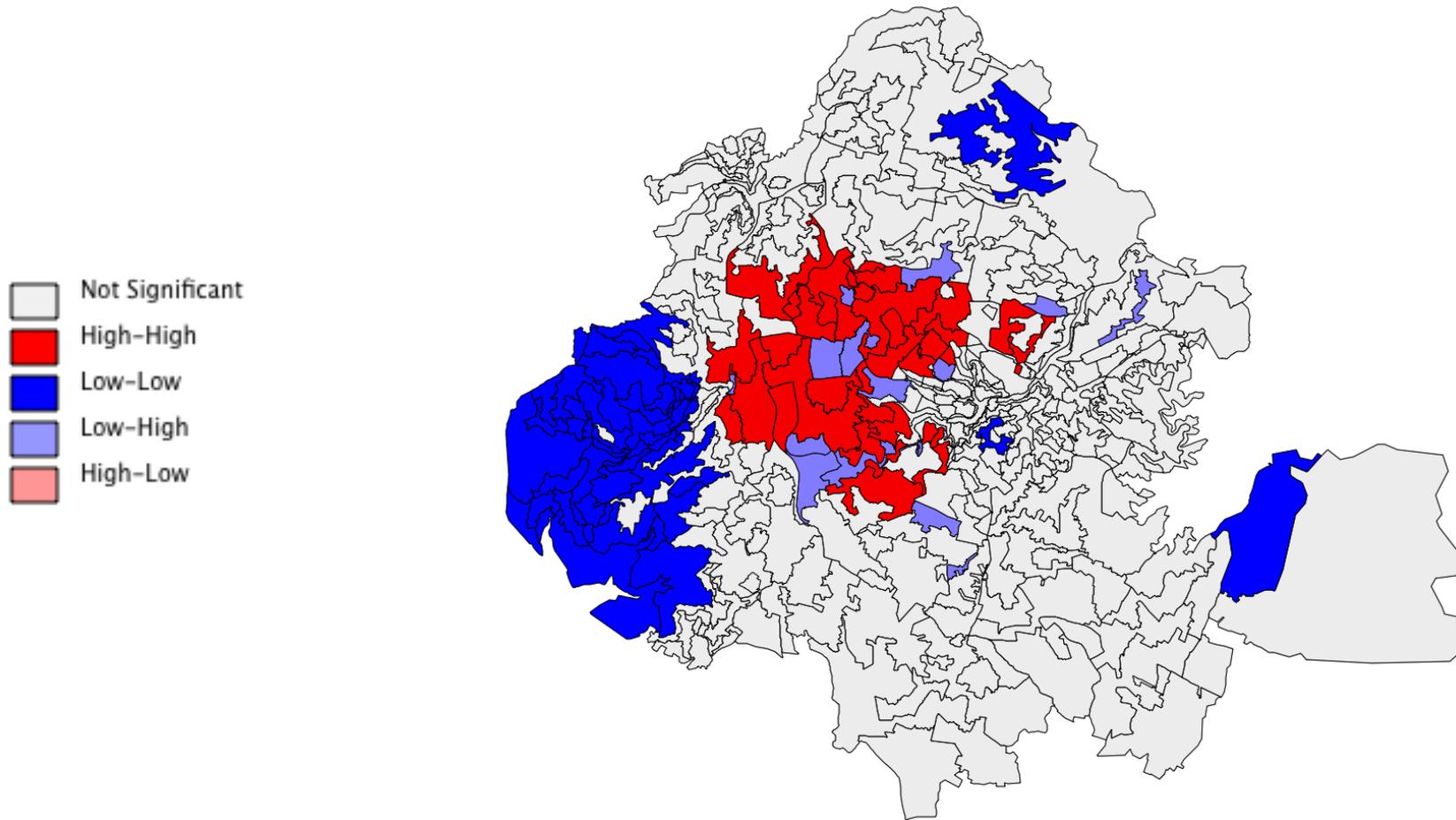
The LISA maps for the overall amount of revenue generated reveal similar trends with local clusters of high revenues in west Amman. Maps 5.8 and 5.9 demonstrate that are strong incidents of high revenues generated in the core of west Amman. Maps 5.10, 5.11, 5.12, and 5.13 indicate that the areas generating high revenues gradually expanded into newer residential developments in the northwestern part of the city. The maps also show clusters of low revenues in the suburbs and parts of east Amman, shown in blue. The clusters of low revenues tend to be found in low density suburban developments located around industrial zones. Collectively, the high degrees of clustering in the amount of water delivered and revenue generated in west Amman suggests that there are differences with respect to water consumption in ways that correspond to socio-economic differences throughout the city. The fact that the core of east Amman did not generate

statistically significant clusters of low water consumption and revenue generated suggests that other factors may be shaping meter readings and water bills.

It is clear that seasonality is not a strong influence nor is the transfer of responsibilities from LEMA to Miyahuna. While data would be required to test how these results compare to consumption patterns under WAJ control, they do suggest that the intensification of the corporatization process since 1999 has had a limited effect on consumption and water distribution.⁹ Nevertheless, there are three possible reasons that explain the differences between trends in overall levels of consumption and revenue generated and the results for the average household.

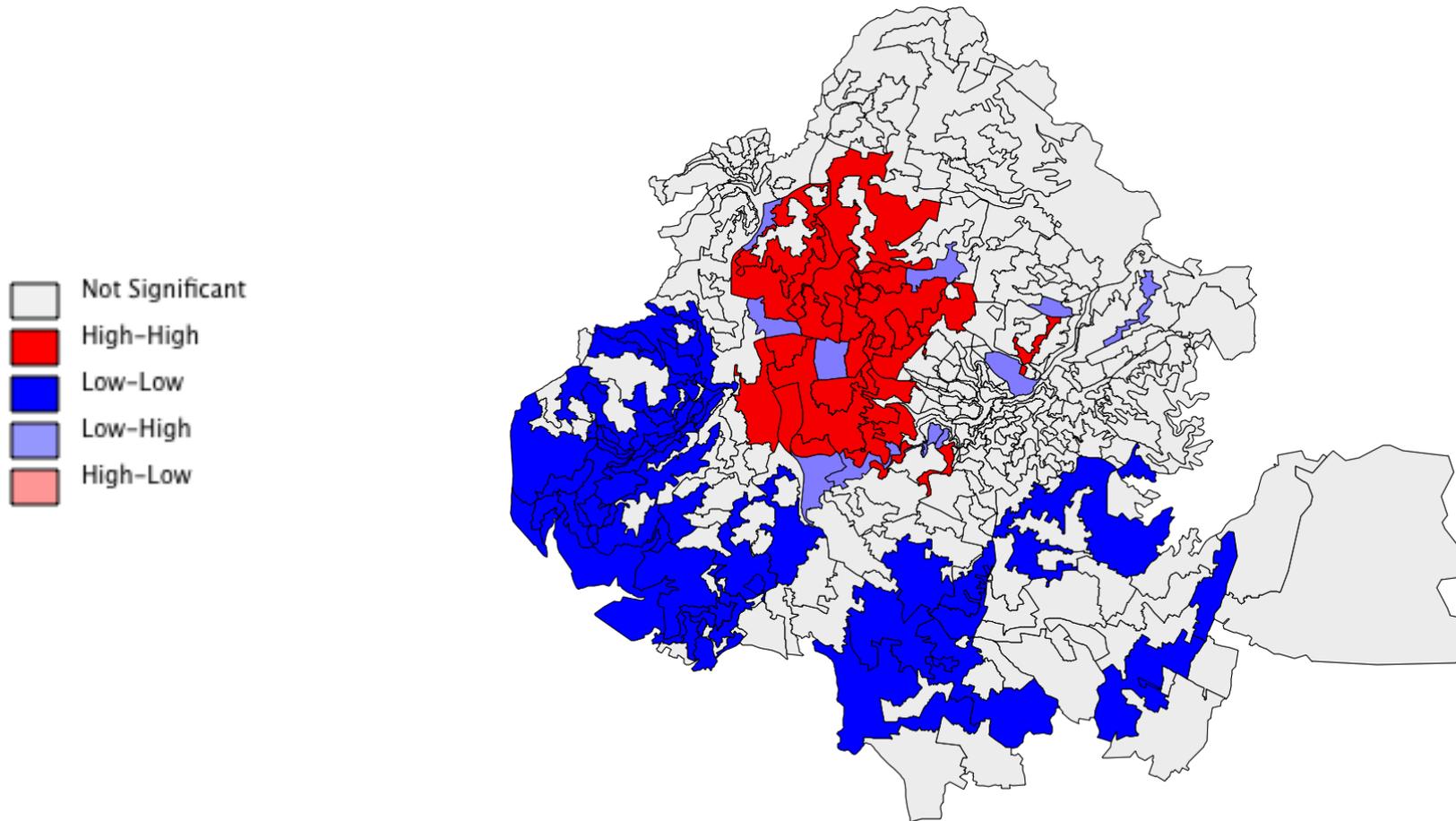
⁹ Miyahuna only agreed to provide data for all years between 2003 and 2012 while WAJ refused requests for data.

Map 5.2 Cubic Meters Delivered January 2003



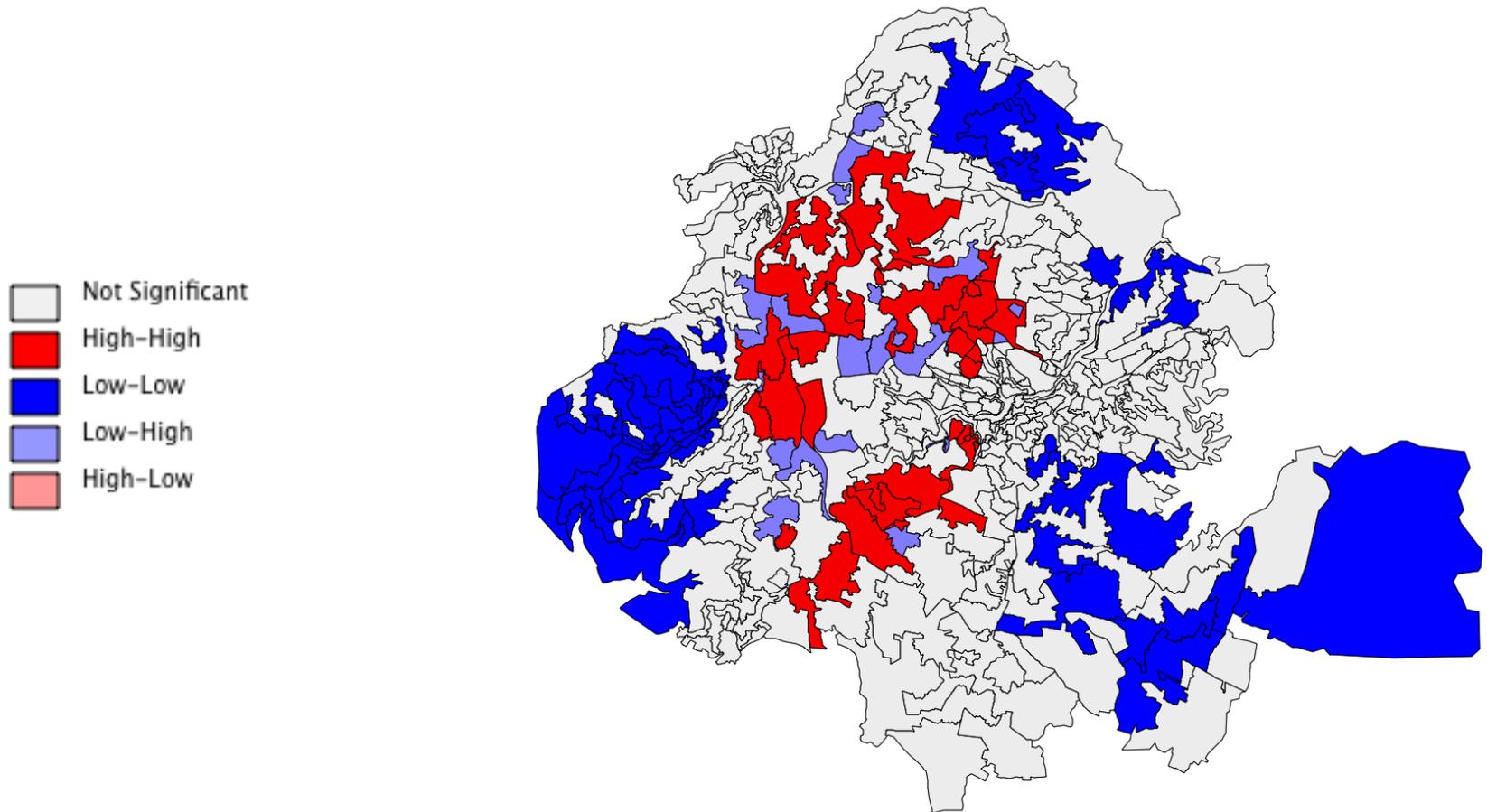
Map Produced by Basil Mahayni, Data Source Jordan Water Company – Miyahuna 2012
Queen Spatial Weight Matrix, Filter $p=.05$, 999 Permutations

Map 5.3 Cubic Meters Delivered July 2003



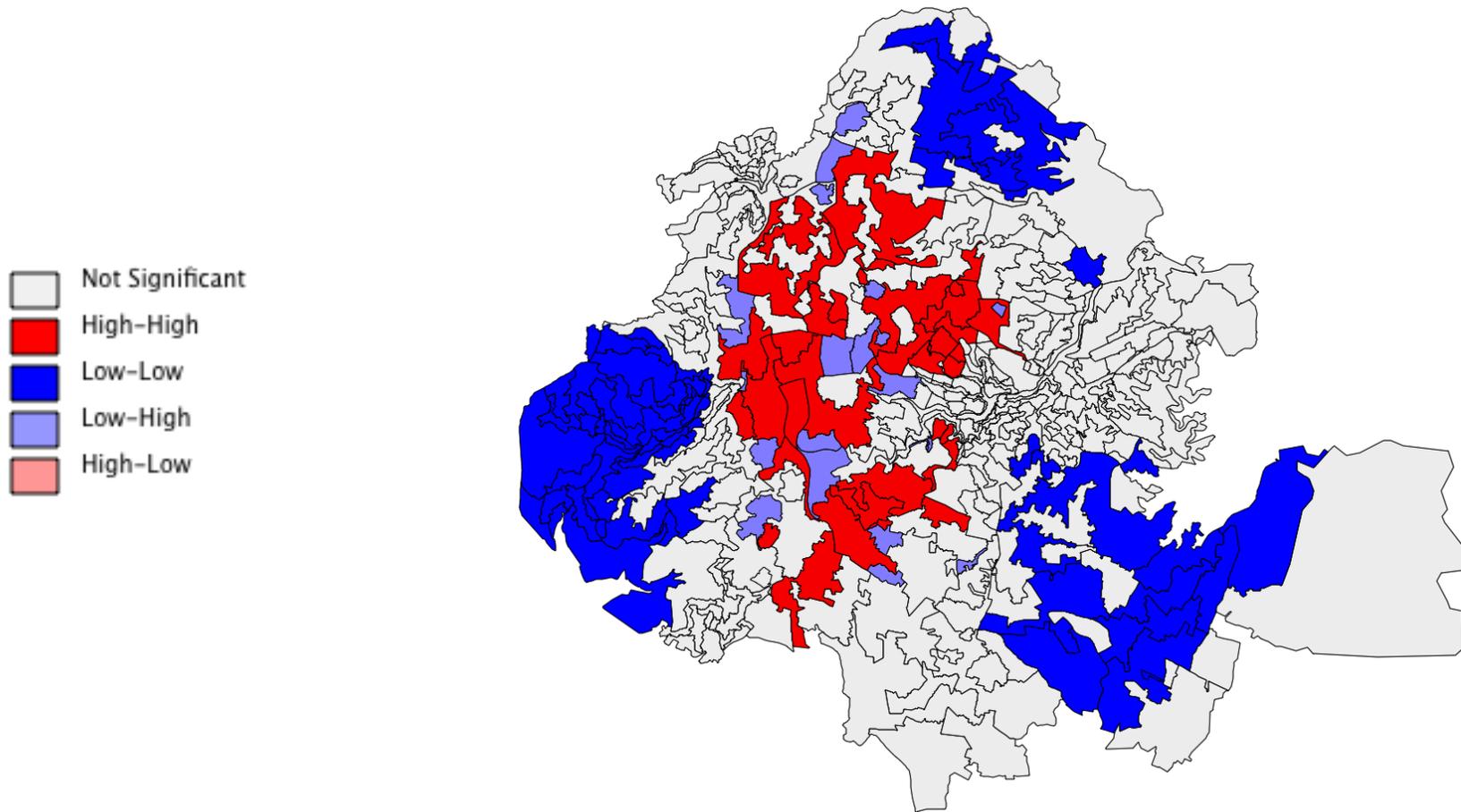
Map Produced by Basil Mahayni, Data Source Jordan Water Company – Miyahuna 2012
Queen Spatial Weight Matrix, Filter $p=.05$, 999 Permutations

Map 5.4 Cubic Meters Delivered January 2007



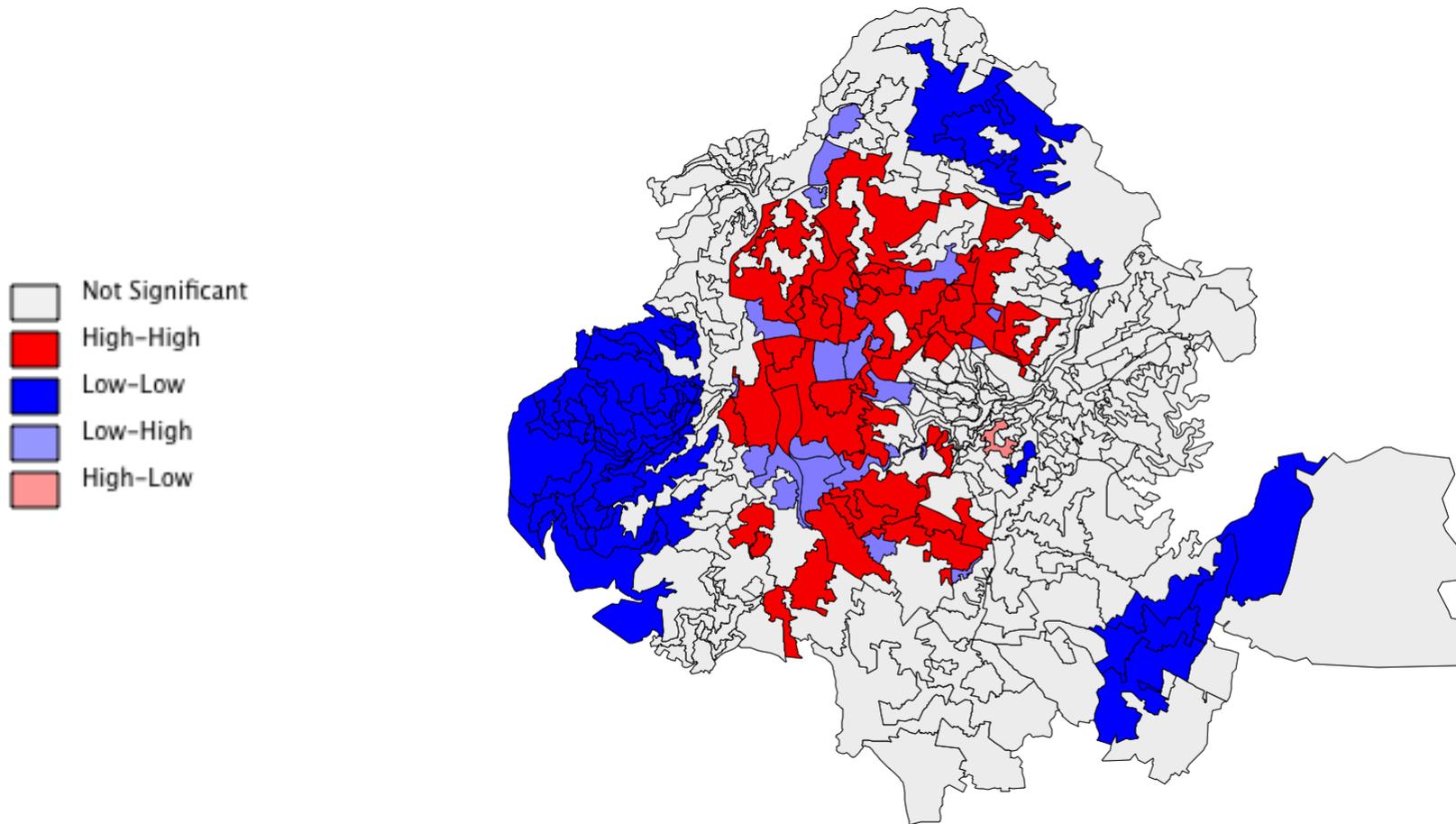
Map Produced by Basil Mahayni, Data Source Jordan Water Company – Miyahuna 2012
Queen Spatial Weight Matrix, Filter $p=.05$, 999 Permutations

Map 5.5 Cubic Meters Delivered July 2007



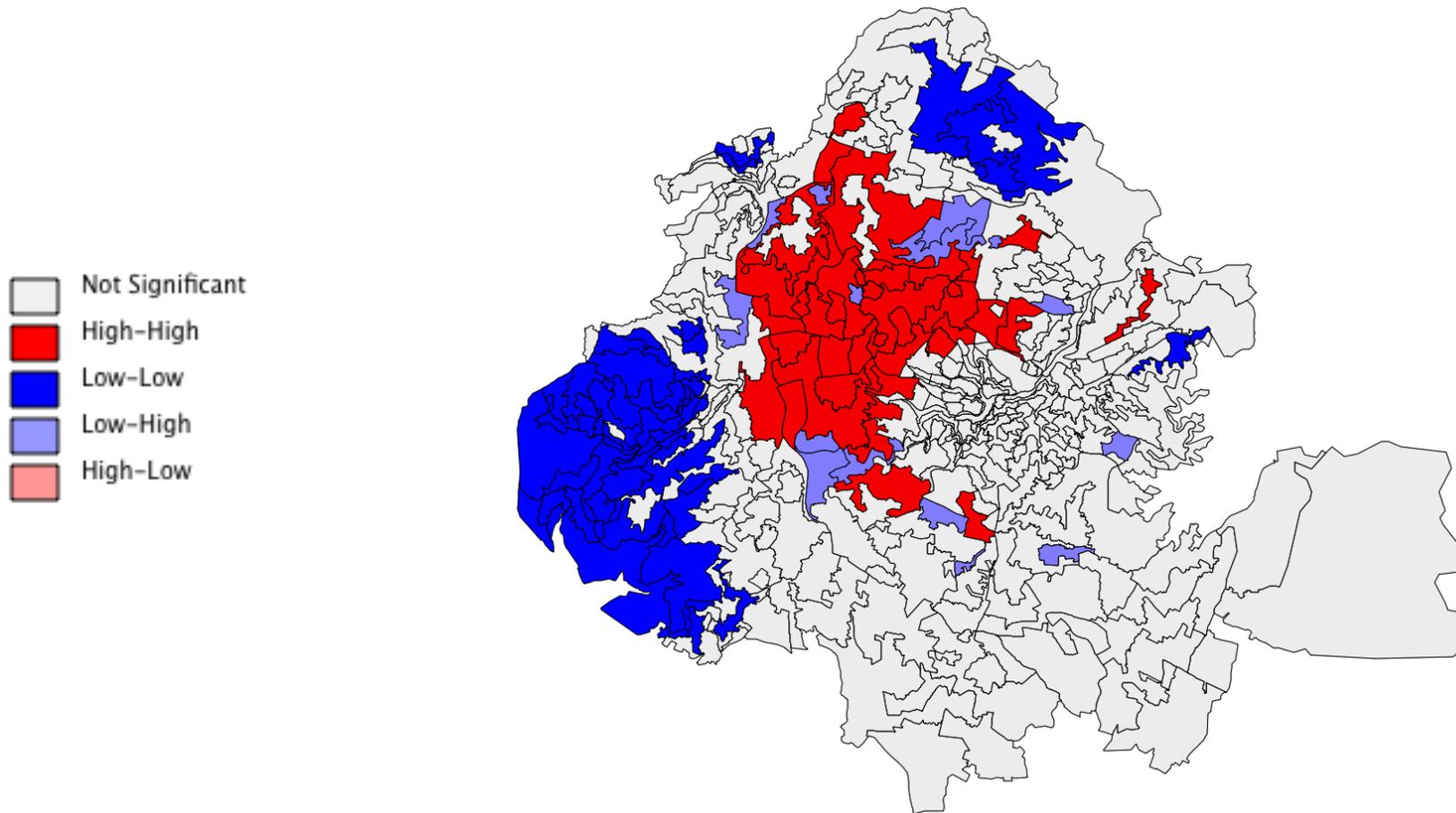
Map Produced by Basil Mahayni, Data Source Jordan Water Company – Miyahuna 2012
Queen Spatial Weight Matrix, Filter $p=.05$, 999 Permutations

Map 5.6 Cubic Meters Delivered January 2011



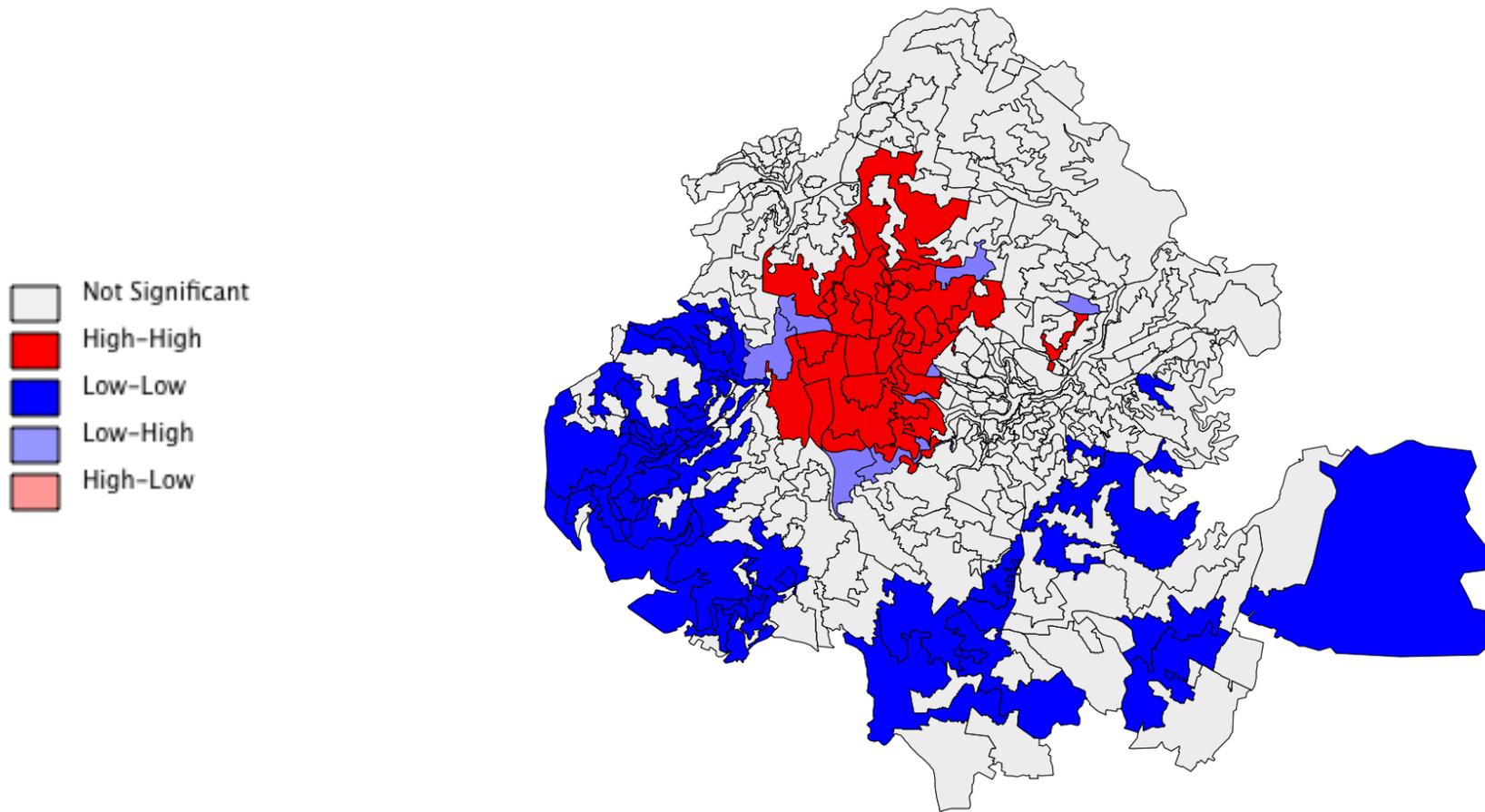
Map Produced by Basil Mahayni, Data Source Jordan Water Company – Miyahuna 2012
Queen Spatial Weight Matrix, Filter $p=.05$, 999 Permutations

Map 5.7 Cubic Meters Delivered July 2011



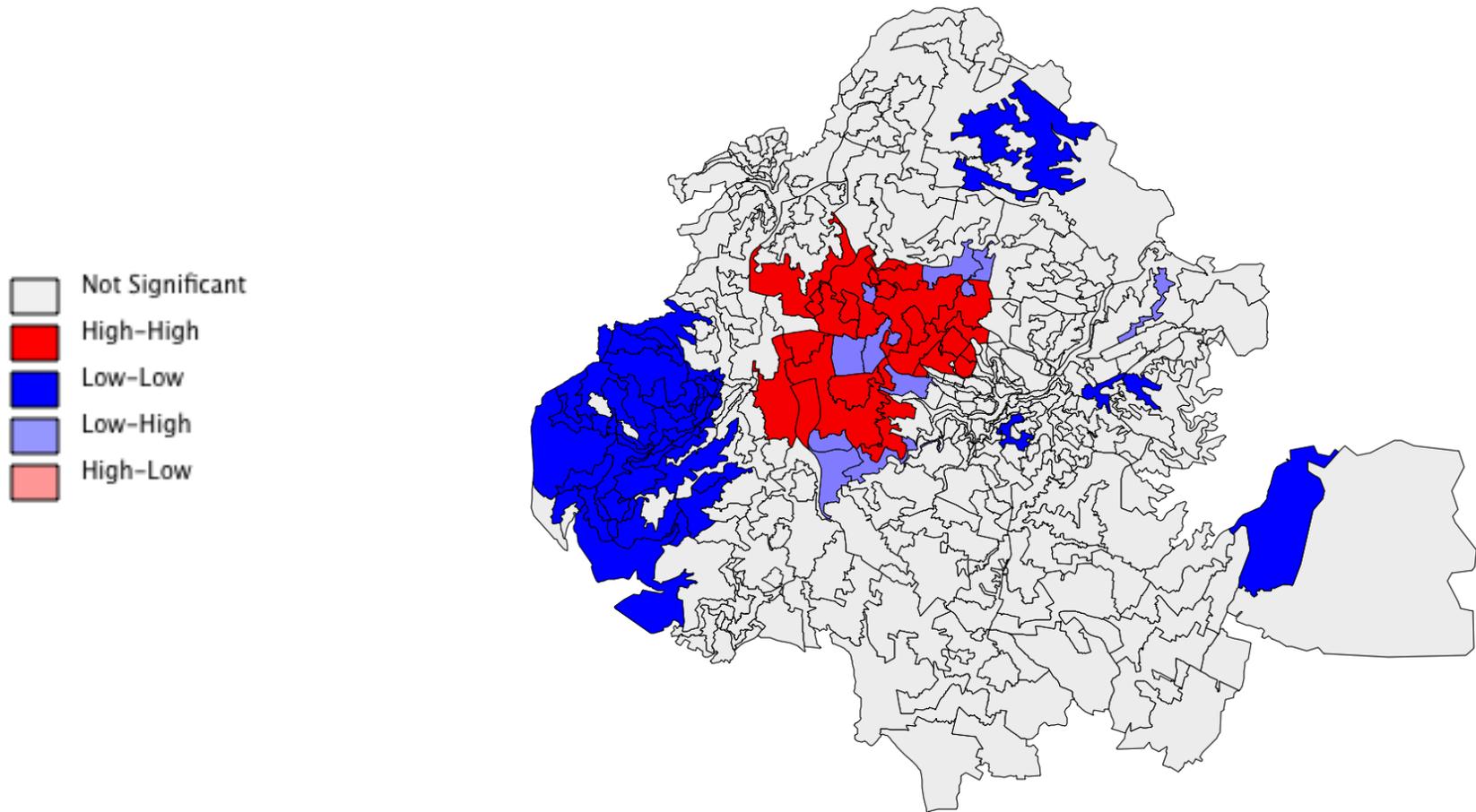
Map Produced by Basil Mahayni, Data Source Jordan Water Company – Miyahuna 2012
Queen Spatial Weight Matrix, Filter $p=.05$, 999 Permutations

Map 5.8 Revenues Generated January 2003



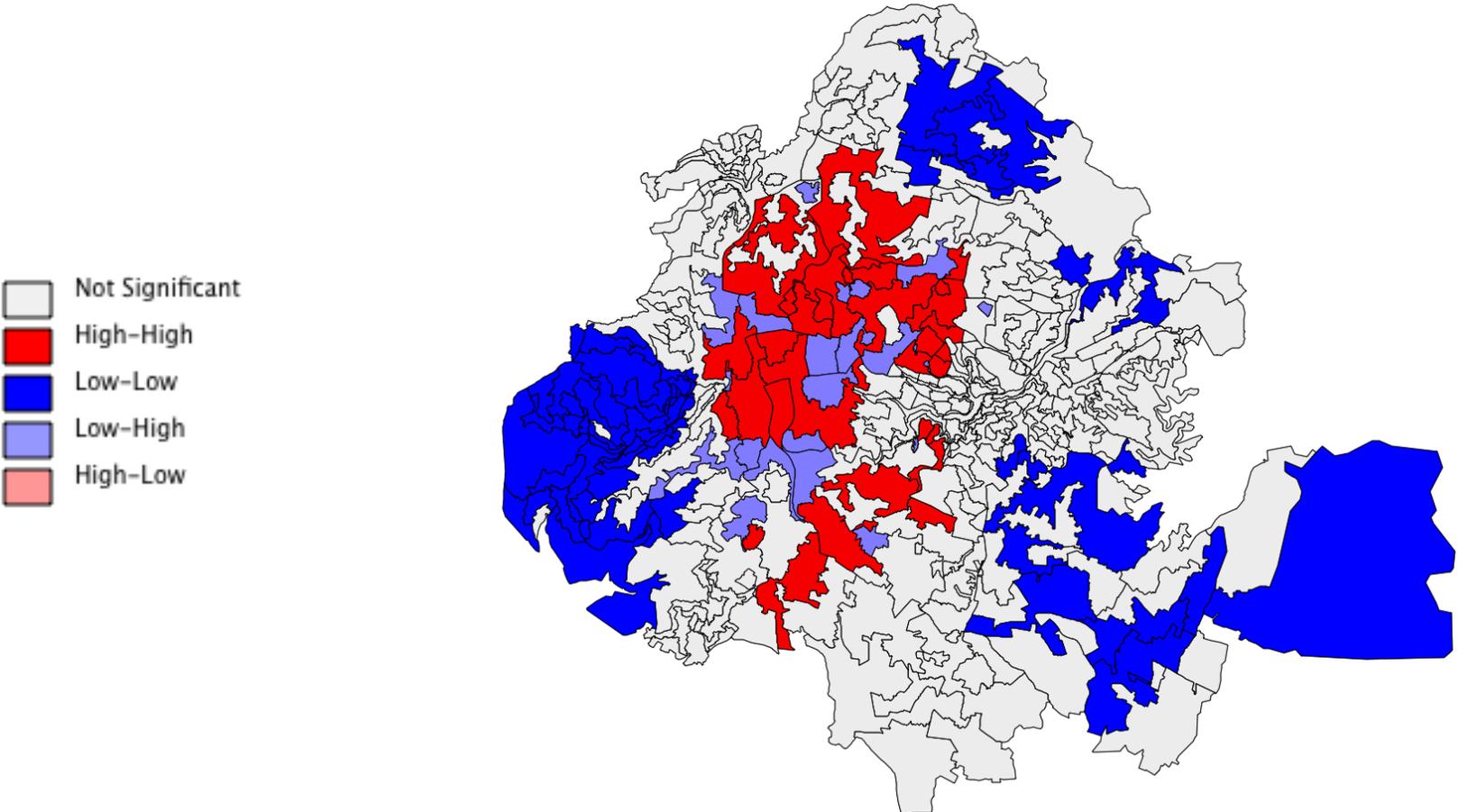
Map Produced by Basil Mahayni, Data Source Jordan Water Company – Miyahuna 2012
Queen Spatial Weight Matrix, Filter $p=.05$, 999 Permutations

Map 5.9 Revenues Generated July 2003



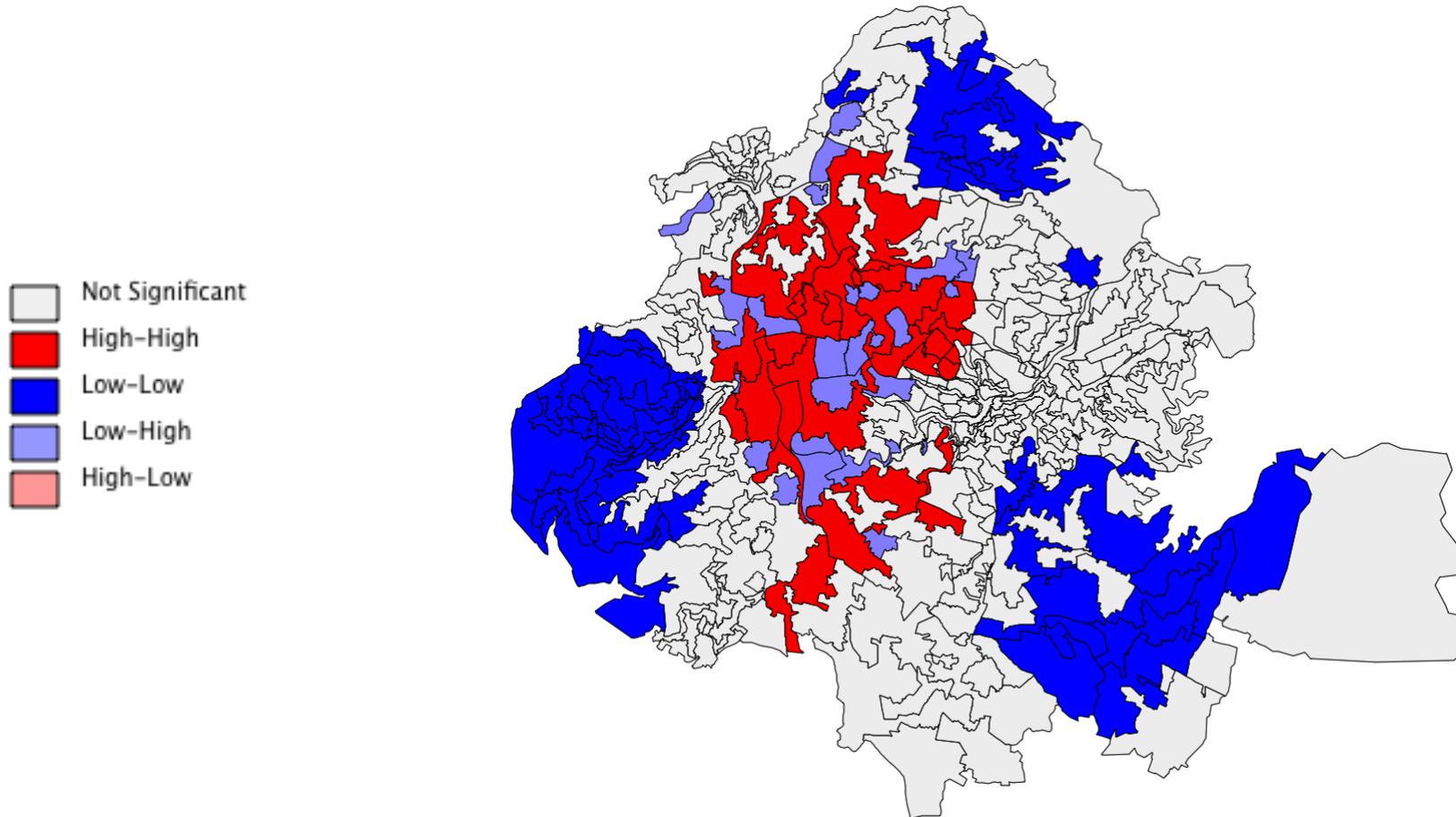
Map Produced by Basil Mahayni, Data Source Jordan Water Company – Miyahuna 2012
Queen Spatial Weight Matrix, Filter $p=.05$, 999 Permutations

Map 5.10 Revenues Generated January 2007



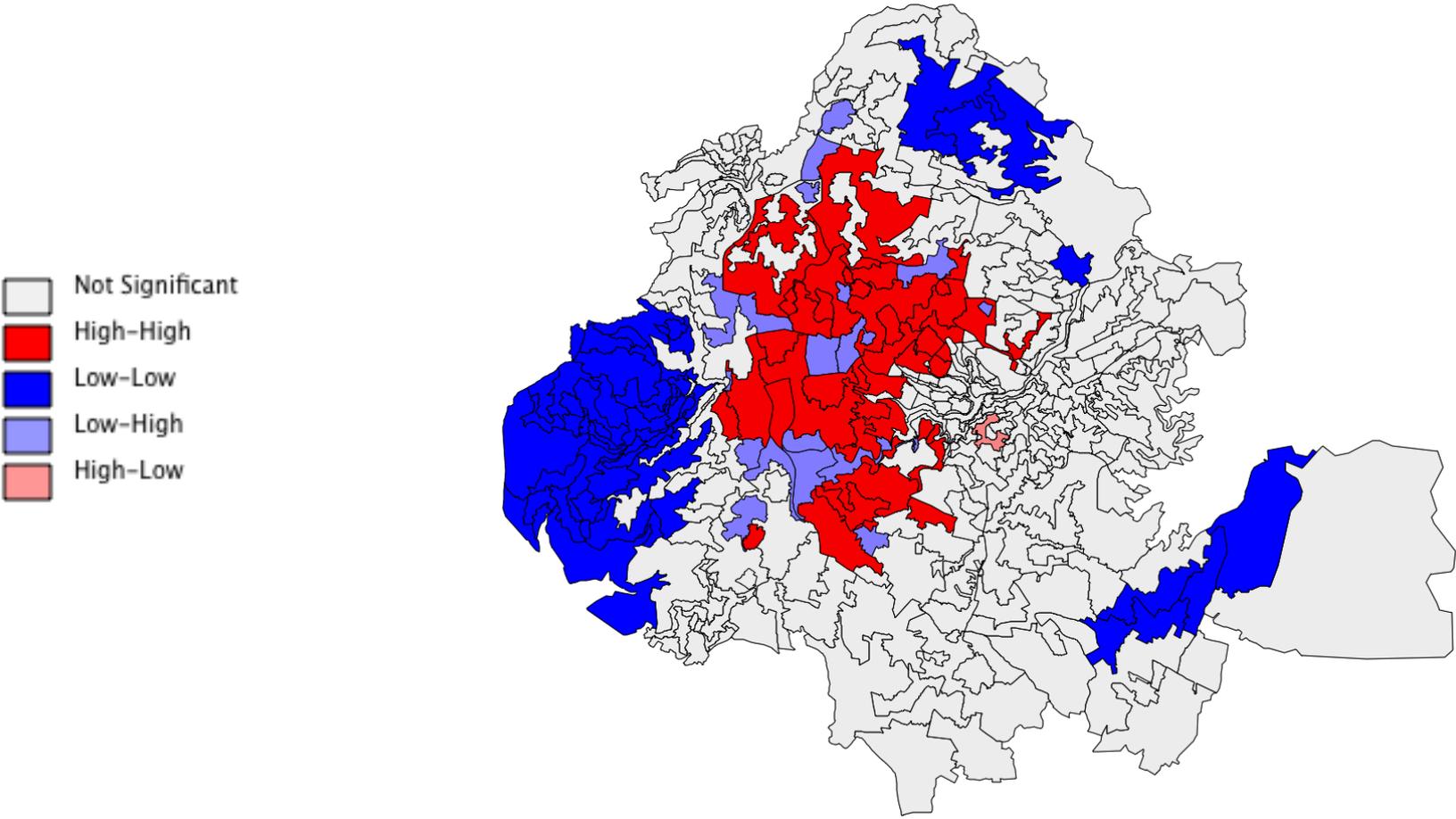
Map Produced by Basil Mahayni, Data Source Jordan Water Company – Miyahuna 2012
Queen Spatial Weight Matrix, Filter $p=.05$, 999 Permutations

Map 5.11 Revenues Generated July 2007



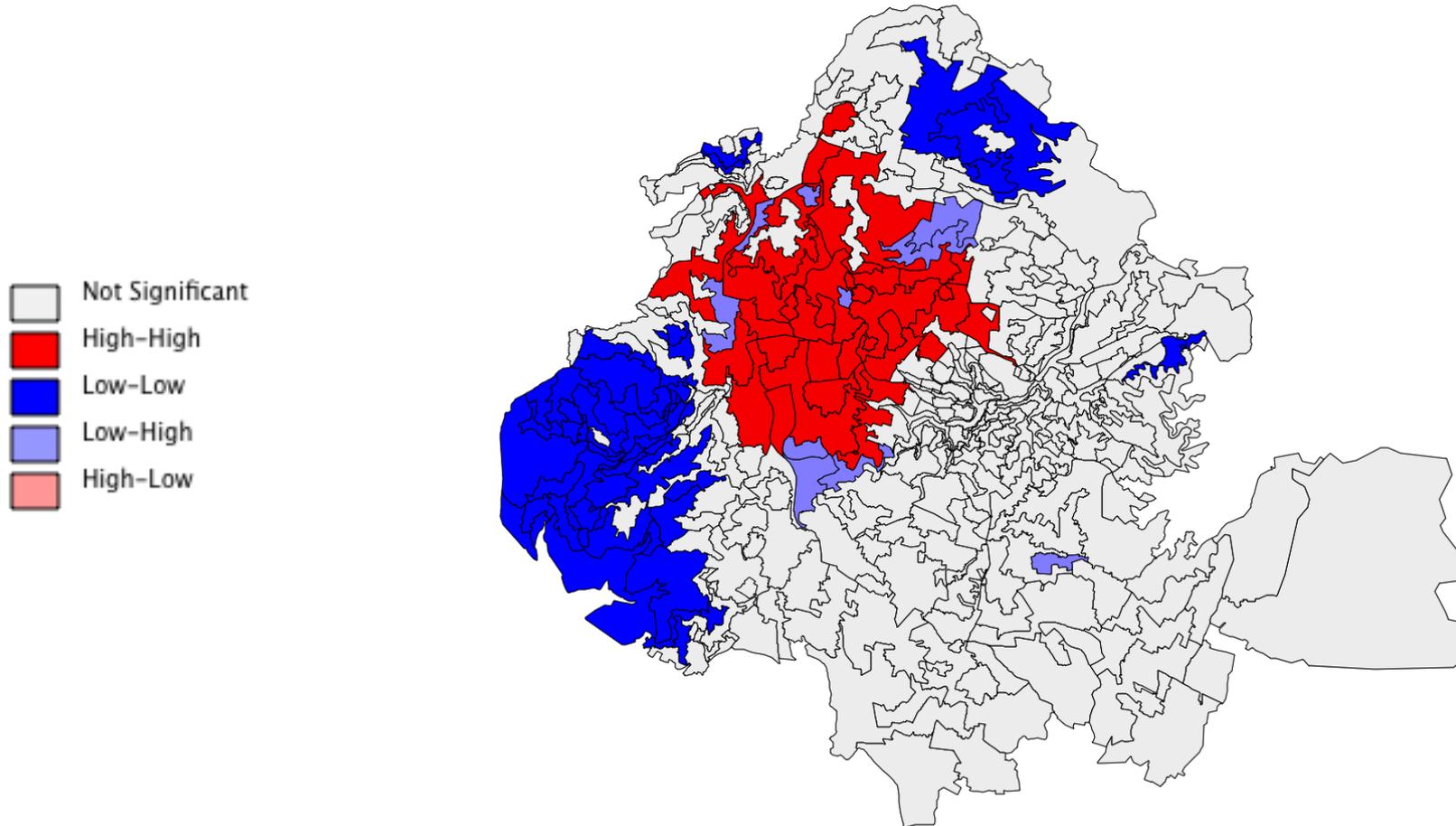
Map Produced by Basil Mahayni, Data Source Jordan Water Company – Miyahuna 2012
Queen Spatial Weight Matrix, Filter $p=.05$, 999 Permutations

Map 5.12 Revenues Generated January 2011



Map Produced by Basil Mahayni, Data Source Jordan Water Company – Miyahuna 2012
Queen Spatial Weight Matrix, Filter $p=.05$, 999 Permutations

Map 5.13 Revenues Generated July 2011



Map Produced by Basil Mahayni, Data Source Jordan Water Company – Miyahuna 2012
Queen Spatial Weight Matrix, Filter $p=.05$, 999 Permutations

One possible explanation is that overall consumption trends in low-income and high-income parts of the city average out at the level of customers billed because the sub-districts combine poor and wealthy neighborhoods. This, however, is unlikely except for a small number of sub-districts in central Amman as a majority of low-income families are concentrated in eastern parts of the city. A second explanation is that customers billed throughout Amman have more or less equal consumption patterns despite significantly different storage capacities. Though household chores and water use for hygiene may not vary by socio-economic conditions, households in west Amman often maintain large gardens and swimming pools. The third explanation is that a few differences appear between the number of customers billed geographically, excluding west Amman, is because other factors cloud the results of the Moran's *I* and LISA analyses, such as shared water meters. This analysis would benefit from a comparison between water bills and number of households in each district, especially since the eastern parts of the city are more densely populated. Evidence shows that many households, particularly in poorer parts of the city, share water meters. This highlights the importance of attending to how individual households interact with the municipal water system, and its intermittent distribution. Indeed, household interviews reveal that there are several factors that shape water access outside of direct water connections to the municipal water network.

Understanding Household Perspectives

Household interviews conducted in 2012 and 2013 suggest that inequalities in access to and consumption of water are shaped by several factors independent of the corporatization process and municipal water services. This may explain the ESDA

results. Household interviews reveal that the intermittent distribution system has differentially affected households as they face billing, water pressure, and storage concerns. This section investigates these three factors in addition to examining how the corporatization process has affected households, and their public perceptions. Interviews were conducted with heads of households living in Amman. The households varied by size, geographical location (neighborhood), socio-economic status, and citizenship.¹ Respondents revealed that socio-economic status plays an important role in shaping water access independent of the corporatization process. In fact, most households welcomed the reforms as they observed significant improvements in municipal water services.

Storage Capacity and Water Use Practices

Household access to water and water use practices is an outcome of the interaction between socio-economic conditions and Amman's intermittent delivery system. It is important to note that intermittent deliveries are not the same as water rationing. Intermittent deliveries are based on the continuous distribution of water into a sub-district for a restricted period of time whereas water rationing restricts the amount of water households can use over a period of time. Under the intermittent delivery system,

¹ It is important to consider geographical location because Amman's topography affects water pumping in significant ways – households at higher elevations sometimes experience reduced water pressure, which may prevent the filling of tanks to capacity. Geographical location can also be an indicator of socio-economic class, and it is important to understand from the perspectives of the households how their income and social standing affect their ability to store water and shape their water-use behaviors. Considerations of socio-economic status also clarify how the block-tariffs and general water prices factor into household expenditures. The last factor, citizenship status, is critical because of the significant numbers of refugees living in Amman and the claims they can make to public officials. Palestinians have been living in Jordan for nearly 60 years, yet not all have the same legal status. When Jordan occupied the West Bank, it granted Palestinian refugees citizenship, but did not extend the same privileges to Palestinians from Gaza. Today, Palestinians from Gaza only hold legal residency but not citizenship. Second, the thousands of Iraqi refugees tend to be better off financially than the Syrians, yet share similar constraints in their ability to file complaints or make claims to public services.

households can use as much water as they desire on days water is delivered and store as much water as possible. Nevertheless, low-income and wealthy households have different storage capacity, largely conditioned by where they live and how much they can afford.

The intermittent delivery schedule ensures that all areas of Amman receive unlimited volumes of water over the course of 24 to 48 hours. On days water is delivered, installed ground level or rooftop tanks or underground cisterns automatically fill when water is delivered while automated measurement levers in the storage tanks cease the water intake once the tank is full. Households without storage tanks only have access to water on the day of delivery. Storage tanks are made of metal or plastic, and range from two to four cubic meters in size. Households are responsible for purchasing, installing, and maintaining storage units.

In east Amman, which is characterized by a high density of older buildings, households are limited to rooftop or ground-level storage tanks. Interview respondents living in east Amman indicated storage capacities ranging from 2 to 6 cubic meters. Some households also fill jerry cans on “water days” in order to supplement their water supplies (Respondent Nine 2013; Respondent Twentyone 2013). In fact, one Syrian family living in Jabal Amman did not have access to any storage units forcing them to collect as much water in jerry cans and water bottles for their weekly use of water. They pleaded with their landlord to make the necessary investments, but the landlord refused to do so without partial investment from the tenants. As Syrian refugees, however, the family could not afford the financial commitment as they were already living beyond their means (Respondent Twentyone 2013). West Amman, on the other hand, is largely comprised of single-family villas and modern apartment buildings built on large parcels

of land. Respondents in west Amman noted that they own underground cisterns, which significantly increase storage capacity to 30 cubic meters or higher (Ray 2010) in addition to storage tanks (Respondent Twelve 2013; Respondent Seventeen 2013; Respondent Nineteen 2013; Respondent Twenty 2013).

Storage capacity plays an important role in shaping lifestyles and quality of living in east and west Amman. One study reported that over 20 percent of the water distributed in Amman is consumed by fewer than 5 percent of households residing in western parts of the city (Namrouqa 2009). The concentration of high volumes of consumption within such a small percentage of families reflects the key role that storage capacity plays as the intermittent systems means they do not have 24 hour access to municipal water deliveries. Four respondents living in west Amman noted that their underground cisterns allowed them to maintain lush gardens without having to implement schedules for water intensive activities (Respondent Twelve 2013; Respondent Seventeen 2013; Respondent Nineteen 2013; Respondent Twenty 2013), with two of the families also owning swimming pools (Respondent Nineteen 2013; Respondent Twenty 2013). Middle and low-income households living in east Amman, however, are forced into planning their water use over the course of the week. With the burden mostly falling on women (Masharqa 2012), households often restrict the number of showers per week or scheduling household chores on “water days” (Respondent Nine 2013; Respondent Ten 2013). The nature of these restrictions, however, can depend on the size of the family (Respondent Two 2012) with small families having more flexibility than larger families (Ray 2010). Seasonality can also affect water use practices among low-volume consumers. In the summer, for example, the hours of water delivery declines due to

reduced volume of water resources in municipal reservoirs while water use increases for laundry, showers, and house cleaning because of higher temperatures and dust in the streets (Respondent Three 2013; Respondent Ten 2013; Respondent Thirteen 2013).

Limited storage capacity can also mean that households need to spend extra money for additional water supplies. On occasion, sub-districts do not receive scheduled deliveries because of complications in the municipal water network. Miyahuna regularly suspends water pumping after rains because treatment plants cannot process turbid waters (Namrouqa 2012b). When this happens, households can file a claim with Miyahuna for a free delivery via water truck but this often requires a personal connection for an immediate response (Policymaker Twelve 2013). All interview respondents had no idea that such a service was available. The alternative is that households restrict or postpone water-based activities, such as showers or laundry, until the next scheduled delivery or consider purchases water from private water vendors (Respondent Sixteen 2013).

Private water vendors are ubiquitous in Amman and notorious for charging high prices. The number of households who purchase water from such vendors is small, at an estimated 2.5 percent in the winter and 5 percent in the summer (Salman, Al-Karablieh, and Haddadin 2008, 300). There are several reasons why households are reluctant to purchase from vendors. First, water quality is questionable and households cannot guarantee that the vendor sourced the water from a regulated water pump.² Second, private vendors sell water at significantly higher prices than Miyahuna. Third, most vendors require that households purchase the entire tank, which range between 4 and 10

² The Ministry of Health, not the Ministry of Water and Irrigation, regulates private water vendors and there appears to be limited oversight into their business practices

cubic meters. For example, a household with 4 cubic meters of storage purchasing from a vendor supplying 6 cubic meters will be forced to buy the extra 2 cubic meters. In some cases, households recruit their neighbors into a group purchase to divide the delivery and cost (Respondent Thirteen 2013). Fourth, it is not always easy for households to hire or ensure timely delivery of water. One respondent noted that it is difficult for her to hire private water trucks because she lives in a dense neighborhood with narrow streets, creating accessibility issues for the truck (Respondent Four 2013). Image 5.1 provides a picture of a four cubic meter private water truck in downtown Amman. Another respondent noted that vendor schedules are not fixed, and thus waiting times can last several hours until the delivery is made (Respondent One 2013).

Ultimately, the design of the municipal water system heightens the impacts of socio-economic constraints on household water consumption and water use practices. Socio-economic conditions determine how much water a household can store each week and how they prioritize their water use, explaining why east and west Amman are characterized by significant differences in water consumption and revenue generated. This dynamic is further mediated by infrastructural, technological, and financial constraints, which dictate the amount of water that actually flows into a storage unit and how much a household spends on its water bills. The location of storage units and water pressure interact with capacity to invest in water pumps and individual connection fees to add another layer to unequal household consumption.

Image 5.1 Private Water Truck in Downtown Amman



Photograph by Basil Mahayni, Amman, Jordan

Infrastructure and Water Pressure

The systematization of intermittent deliveries and improvements in the monitoring of water meters has created three related ways in which wealthy and poor households are differentially affected. First, low water pressure plagues Amman's water network due to the intermittent delivery system. This can significantly slow the rate of

intake into rooftop storage tanks, and result in units being less than full after water deliveries are complete. Second, Miyahuna has encouraged households to relocate water tanks to the ground level in order to ensure that tanks are filled to capacity each week. This, however, fails to address the effects of low water pressure as households suffer from low water pressure in faucets and showers when tanks are located at the ground level. Consequently, many households are forced to install water pumps to bolster water pressure for intake into the storage unit or into the home, but this requires additional investments in pumps, infrastructure, and electricity. Third, costs associated with merely accessing water have deterred many households from registering individual meters. In many cases, households share a water meter in order to divide registration costs, but this ends up increasing household water bills.

Though the CIP allowed Miyahuna to guarantee water deliveries to building access points, the gravity-based design creates water pressure problems that limit the replenishment of storage tanks for many households. As part of the CIP, ground reservoirs and water towers were installed to supply distribution networks through gravity-based pumping into sub-district water transmission lines. Each day of the week, different reservoirs and towers receive water from the primary transmission lines and transfer water to secondary and tertiary distribution networks to households. Despite the success of the CIP in revising and stabilizing municipal water deliveries, Amman's topography and the intermittent delivery system create fluctuations in water pressure that ultimately affect replenishment of household storage units.

The geographic location of households is an important factor in the availability of strong water pressure. The gravity-based system ensures strong water pressure when

pumping water from reservoirs or towers to lower-elevations whereas households residing at elevations higher than the reservoirs or towers face problems replenishing their tanks due to low water pressure. Additionally, households located near major institutional centers, such as hospitals or Royal Palaces, benefit from strong water pressure. The water pressure concerns in the networks can equally impact low and wealthy households. Two respondents living in west Amman noted that their tanks regularly do not fill to capacity because of low-water pressure (Respondent Eighteen 2012; Respondent Twenty 2013) whereas one interview respondent in east Amman noted that they regularly experience strong water pressure because of their close proximity to a major hospital (Respondent Thirteen 2013). It is important to keep in mind, however, that the geographical impact on water pressure stems from a household's elevation and proximity to water towers and reservoirs and not from their location in east and west Amman.

A household's location does, however, play a critical role in determining how well it can improve low water pressure. Miyahuna guarantees water deliveries to building access points, but households are required to take the necessary steps to ensure the storage of water (Policymaker Seven 2013). In some cases, however, rooftop storage tanks may not fill to capacity each week because the water pressure may not be strong enough to push water several stories high. In response, Miyahuna has encouraged households to install ground level storage tanks in order to alleviate service gaps (Policymaker Seven 2013). Households with ground level storage units, however, can suffer from low water pressure in kitchen and bathroom faucets and showers (Respondent One 2013). More critically, not all households have the option of installing ground level

water tanks. Many new apartment units throughout Amman incorporate space for ground level water tanks whereas older neighborhoods, especially in east Amman, were not built with such considerations. As such, there are serious space limitations that prevent this possibility of relocating roof top storage units. Image 5.2 depicts this density in the Ashrafiyeh neighborhood in east Amman.

Image 5.2 Ashrafiyeh Neighborhood, East Amman



Photograph by Basil Mahayni, Amman, Jordan

In response, authorities have encouraged households to install water pumps to increase water pressure for filling rooftop tanks or improving water pressure in building pipes (Policymaker Seven 2013). A household survey noted that 40 percent of wealthy households use localized pumps compared to 28 percent of low-income families (Potter

and Darmame 2010). One reason for this difference is the added cost of installing a local water pump. A two cubic meter tank can cost in the range of 50 to 100 Jordanian Dinars, while an electrical pump can cost 15 to 35 Jordanian Dinars. Households also need to factor labor and installation of any other fixtures required to complete the installation of the pump and storage tank (Gerlach and Franceys 2009). Investment in household water infrastructure, however, is not a one-time deal. Households must maintain treatment of storage units for quality purposes and monitor and address any malfunctions in the storage tank or pump, or leaks in the pipes. Consequently, some households are reluctant to install electric pumps (Respondent Seventeen 2013) because electricity prices have radically increased in recent years (Kadri and Kershner 2012).

Ultimately, the design of Amman's municipal water services has required households to take on significant expenses beyond mere connection fees. The system is compounded by the fact that there are high fixed fees as compared to low variable costs associated with water bills. It is estimated that the average household in Amman invests nearly 700 Jordanian Dinars just in household water systems, including pipes, tanks, and pumps (Ray 2010), not including water connection fees and installation of water meters. Fees associated with the installation of water meters and connection to the municipal water network depends on a number of conditions, including homeownership and age of the building (Jordan Water Company 2014) with prices ranging from 250 Jordanian Dinars (Respondent Sixteen 2013) to 450 Jordanian Dinars (Respondent Eleven 2013). Together, the installation of necessary equipment and connection fees can total nearly 1000 Jordanian Dinars, or one-third of the annual minimum wage. The high fixed cost of connecting to the water system is difficult to assume for households with little financial

flexibility. Because of these expenses, many low-income households opt share water meters.

Households sharing a water meter receive one water bill from Miyahuna. In some cases, households divide water bills with other family members residing in the building, and in others landlords share water meters with tenants (Respondent Nine 2013; Respondent Fifteen 2013; Respondent Seventeen 2013). The prevalence of sharing water meters is quite high. Potter and Darmame (2010) reported that 56 percent of low-income households they surveyed share a water meter as compared to 12 percent of wealthier households. Gerlach and Franceys (2009), on the other hand, reported that 38 percent of their low-income survey respondents share a water meter.³ Though sharing water meters is a way to by-pass the connection fees, households do not necessarily save in the long run as the collective volume of water consumed may push the water bill into higher price blocks.

One respondent noted that his extended family, which occupies the entire building, shares one water meter. His father pays the monthly bills and each family reimburses him for all utility expenses (Respondent Seventeen 2013). Another respondent, a young man from Iraq, shares 6 cubic meters of water with his landlord, landlord's wife, and two sons. Each month, he pays 5 Jordanian Dinars to his landlord for water, or about half of the quarterly bill, which is about 30 Jordanian Dinars (Respondent Fifteen 2013). In both cases, each household pays higher prices per cubic meter than they would if they owned a single water meter. For example, the tenant and landlord pay Tier

³ Of the respondents, 19 percent were shared between two households, 10 percent between three households, 8 percent between four households, and 1 percent between five households (Gerlach and Franceys 2009)

3 prices based on their collective consumption. The tenant, however, would likely only pay Tier 1 prices if he had his own water meter.

The social and economic inequalities generated by low water pressure, access to infrastructure, and water meters stem from the design of the intermittent distribution system. Authorities calling on households to take steps to improve access to water services by relocating water tanks or installing electric pumps do not take into consideration that households often face severe space and financial constraints. This produces substantially different experiences for low-income and wealthy households beyond municipal water bills. The corporatization process, particularly the tariff revision, risks accentuating these inequalities if the reality of household experiences with the fixed costs associated connecting to the water system specifically, and the general costs of accessing water are not seriously considered.

Implications of Corporate Restructuring

Household experiences with the municipal water system provoke varying opinions about the corporatization process. Jordanians are willing to accept higher prices for water and private sector participation so long high quality public services are provided and authorities are held accountable. The fact that perceptions of public opinion have played a key role in stalling the corporatization process of municipal and national water services merits closer investigation. Indeed, one of the key claims in academic literature is that corporatization has systematically affected low-income households. In the case of Jordan, however, frustration with water services do not necessarily stem from the corporatization process. Rather, they are embedded in the ways households are forced

to interact with the design of municipal water system. Corporatization processes risk reinforcing these inequalities, as evidenced by the impacts of the tariff revision in 2011, which pushed many households in lower price brackets into higher tiers. Failure to understand household experiences and opinions may reinforce the political constraints shaping water sector reforms while also deepening the inequalities in access to water.

Indeed, water authorities are cognizant of growing discontent among Jordanians in response to subsidy reductions and lack of accountability in public policy (ICG 2012; Vogt 2011). Jordanian authorities, however, have failed to acknowledge the heterogeneity of these opinions. This is exemplified by the fact that Jordanians have not directed their protests at water management issues or the privatization processes despite having to pay higher prices. The 1997 and 2011 tariffs increased water prices, particularly for low-income households. Prior to the 2011 tariff, Gerlach and Franceys (2009) reported that only 3 percent of households surveyed paid Tier 1 prices compared to 46 percent paying three times the minimum charge and 14 percent paying more than ten times. The 2011 tariff revision, which added three more price blocks, increased water prices between .60 Jordanian Dinars and 11 Jordanian Dinars depending on consumption (Namrouqa 2010). Yet, after its implementation, less than one percent of all households billed in June 2012 were charged Tier 1 prices whereas almost 70 percent of all household bills were in Tier 2, 3, and 4 (Jordan Water Company 2012).⁴

Despite more households paying higher prices, few indicated being frustrated with water prices. In fact, respondents have praised the reform processes for significantly

⁴ Of the households billed in June 2012, 23.75 percent were in Tier 2, 27.57 percent in Tier 3, and 21.38 percent in Tier 4, 12.35 percent in Tier 5, and 6.35 percent in Tier 6, and 3.27 percent in Tier 7 (Jordan Water Company 2012).

improving municipal water services since the LEMA contract began in 1999. In particular, households feel that customer services are more responsive, water delivery schedules are more consistent, and that household bills are more standardized and easier to pay (Respondent Three 2013; Respondent Five 2013; Respondent Eleven 2013; Respondent Thirteen 2013). Affirming the belief held by water authorities that people will accept higher prices with better services (Policymaker One 2012; Policymaker Four 2012), some households expressed a willingness to pay more for water services. Though they could not or would not pay more than 2 to 5 Jordanian Dinars (Respondent Four 2013; Respondent Five 2013; Respondent Ten 2013). Price increases however must be accompanied by improvements to water pressure, the frequency of delivery, and reductions in water leaks (Respondent Three 2013; Respondent Four 2013; Respondent Six 2013; Respondent Nine 2013) in addition to reducing the fixed cost of connecting to the municipal water system. Failing to do so may force low-income households sharing water meters to pay higher prices and may lead to questions of accountability, which has become a hot topic in Jordan after several corruption incidents were revealed during the privatization of the telecommunications and energy sectors (Respondent Nine 2013; Respondent Thirteen 2013).

The perceived absence of accountability has been reinforced by the fact that Jordan's water sector institutions fail to communicate effectively with their customers (Marketing Research Organization 2012; Shridhar 2012a; Shridhar 2012b). Few respondents noted receiving any direct communication in the form of brochures, phone calls, or letters on water sector initiatives (Respondent Three 2013; Respondent Four 2013; Respondent Eleven 2013). Households are often not informed about scheduled

service disruptions or the extent of Miyahuna's services or the fact that billing schedules are subject to change (Marketing Research Organization 2012) while households are generally unaware of the services provided by the water utilities, such as Miyahuna's willingness to provide contractors free of charge for households desiring to install new water tanks or update local infrastructure (Policymaker Seven 2013). This failure to communicate with customers is exemplified by how well households understand their water bills or the extent of the water subsidies. A majority of respondents recognized that their water bills are subsidized (Respondent One 2013; Respondent Two 2012; Respondent Four 2013; Respondent Five 2013; Respondent Six 2013; Respondent Nine 2013; Respondent Ten 2013; Respondent Eleven 2013; Respondent Twelve 2013; Respondent Thirteen 2013; Respondent Sixteen 2013; Respondent Seventeen 2013), however, few could identify the extent of the subsidy or understand how the subsidy was calculated. In fact, one believed that existing government subsidization of household water bills was an institutional cover for theft by public officials (Respondent Ten 2013).

Indeed, it is perceptions like these that the government fears. Chapters Three and Four demonstrate how governmental authorities use political institutions and decision-making processes to avoid controversial issues, no matter the long-term effects for the water sector. Authorities, however, have failed to adequately understand household experiences and opinions and communicate their strategies to their constituents. In fact, most household respondents did not know much about the water sector's corporatization process, with one respondent believing that LEMA was still responsible for managing Amman's municipal water services despite the fact that their operations ceased in 2007 (Respondent Three 2013). This has created widespread speculation about what the

government is doing and why, which, when combined with direct experiences with Amman's municipal water services, generated strong and varying opinions about the corporatization process. Collectively, household opinions reflect a heightened awareness of and concern for accountability in municipal water services and in the corporatization process.

On the one hand, corporatization was a meaningful and welcome intervention as an alternative to the public sector. Households note that municipal water services have significantly improved since 1999 because private water companies prioritize customer services and efficiency (Respondent Six 2013). One Jordanian-Palestinian man living in east Amman said, "the private company will give you your needs and will take from you its needs. But the government is different. Privatization is business and I do believe in business" (Respondent Eleven 2013). The public sector, on the other hand, is belied by the lack of incentives and measures that hold authorities accountable. The solution for this, they argue, is to allow private companies to oversee municipal water services with governmental oversight (Respondent Fifteen 2013). Indeed, many mentioned that public-private partnerships and state owned enterprises provide the safest model (Respondent One 2013; Respondent Ten 2013).

Others argued that general privatization and public private partnerships are not feasible in Jordan because the government is too weak to hold the private companies accountable (Respondent Seventeen 2013), which would negatively impact low-income households. One Jordanian-Palestinian woman from east Amman feared that corporate control over municipal water services would negatively impact families like hers, stating, "the private sectors, very hard with people and the only thing they care about is money.

They don't care about the services" (Respondent Thirteen 2013). Indeed, the capitalist incentives involved in the privatization process compelled one to label the privatization process as "administrative corruption." This Jordanian-Palestinian man noted,

Privatization is administrative corruption. And it's very easy to know that. If you lived 50 years in Jordan, and every day they privatize a company, you won't see any privatization for a failed company. They take the most profitable companies and they privatize it...

Indeed, the government does not have an exemplary record of privatizing or corporatizing its public sectors, with several highly public incidents of corruption taking place during the privatization of the electricity and telecommunication sectors (Tomaira 2008). This compelled a Jordanian-Palestinian woman to describe the process as an indication governmental corruption in transferring service responsibilities to particular private companies (Respondent Nine 2013).

Collectively, the mixed-opinions regarding privatization, public sector management, and public-private partnerships reflect a strong concern over accountability. These opinions are partially informed by household experiences with municipal water services over the last fifteen years and public perceptions of governmental transparency over policy decisions. Indeed, the government's fear of public backlash has played a strong role in shaping progress in water sector reforms. Yet, households are willing to accept higher prices and expressed a willingness to pay more while also offering varying opinions about reform programs. This means that the government could do a better job of understanding public sentiment and taking their experiences seriously in the policy reform and implementation processes.

Conclusion

Privatization programs in municipal water services have received extensive scrutiny, especially by critical scholars. In particular, scholars have highlighted how privatization introduces profit-incentives into water management (Swyngedouw 2005), which result in higher prices for urban consumers (Shiva 2002) and expose poorer communities to new mechanisms that regulate their use of water (von Schnitzler 2008; Loftus 2006b). These mechanisms dispossess poorer communities of access to water and over its regulation (Bakker 2010). The case of Amman, however, suggests that the focus on privatization processes and their outcomes interact with the design of the municipal water system to produce different experiences throughout the city.

The design of the municipal water system plays a critical role in shaping household experiences and access inequalities, while corporatization processes can improve household experiences with water utilities through improved customer and delivery services. This is not an endorsement of corporate restructuring. Rather, the intention is to highlight the fact that, in some cases, corporatization can improve services for customers despite the fact that significant institutional and political constraints affect the water sector. Consequently, authorities must carefully understand how high fixed connection fees and Amman's intermittent water distribution systems produce access inequalities. If the factors underlying these inequalities are not carefully considered, the proposed tariff revisions, a key element of the corporate restructuring process, will likely intensify the inequalities – as evidenced by the 2011 tariff revision.

Indeed, the combination of limited water resources and institutional and political constraints has impeded the water sector's capacity to produce an equitable municipal

water system. Water engineers do not favor intermittent supply systems because it accelerates deterioration of water infrastructure. Yet, with few options for increasing water supplies to Amman, authorities were forced to standardize and systematize intermittent water distribution throughout the city. The CIP ensured that nearly all households are connected to the formal water networks and have weekly access to municipal water supplies. The ESDA, however, revealed a contradiction in that there is clear spatial clustering in where water is consumed and where revenue is generated in Amman while there are few differences in the average revenue per cubic meter and average customer consumption throughout the 314 sub-districts. This contradiction can be explained by the fact that customers billed often aggregates average households, despite their starkly different capacities to store and consume water. Household inequalities are compounded by pressure issues and other associated expenses. It is no surprise that households unable to afford their own water meter, expand storage capacity, or improve water pressure tend to be poorer.

In light of these realities, households demand accountability from the water authorities. Households are already doing the best that they can to conserve water consumption and taking the necessary measures to ensure access to water. Jordanian authorities, on the other hand, have not been transparent in communicating about the state of the water sector and the reform programs. This has generated mixed opinions about the privatization of municipal water services. Democratizing the reform process and doing a better job of assessing public opinions and perceptions would alleviate the challenges to the water sector produced by governmental responses to public opinion. It could also perhaps pave the way for more sustainable solutions for the water sector. Without this,

the next phase of the ISSP risks more failure and the possibility of real discontent as the IMF pushes Jordan into revising its water tariffs. This underscores why it is important to carefully understand how the realities of and barriers to household access and consumption may interact with privatization programs. The failure to consider household experiences may lead to additional reform challenges and accentuate socio-economic inequalities.

Chapter 6 Conclusion

The question addressed in this dissertation is how have fifty years of municipal and national water sector development affected municipal and national water management and reform processes? Mainstream analysts argue that Jordan's water sector suffers from a supply and demand mismatch, institutional overlap and mismanagement, energy scarcity, and poor financial management. These are compounded by regional conflicts and domestic challenges stemming from recurring refugee crises over the last fifty years. The push to corporatize Jordan's municipal and national water services, which has been underway since 1999, draws heavily on these issues. The link drawn out between these problems and corporate restructuring as a proposed solution is generally framed through economic and engineering frameworks, with intent of depoliticizing water management. This approach, however, draws on economic and engineering frameworks that mischaracterize the institutional and political dynamics of the water sector's operational systems and services.

The case for corporate restructuring in Jordan thus merits reconsideration. Four bodies of literature on scientific representation and modernization, state building and water sector development, the political and economic histories of municipal water services, and corporatization and privatization of municipal water services provide insight into how and why Jordan's water sector always seems to be in crisis. First, scholarship addressing the relationship between forms of scientific representation in development argues that hydrological, engineering, and economic frameworks facilitated politically charged modernization of state institutions and economic development processes (Meehan 2014; Mahayni 2013b; Linton 2010; Alatout 2009; Barnes 2009;

Alatout 2008; Molle, Mollinga, and Wester 2009; Scott 1998). Scholars, however, have yet to draw on this research for explaining why privatization and corporatization continue to dominate global debates around water management (see Harris, Goldin, and Sneddon 2013). This scholarship provides valuable insights on the ways that scientific, engineering, and economic frameworks depoliticize debates about municipal and national water management crises and privatization as a solution (see Mahayni 2013a).

Second, related research suggests that while modernization programs were successful in building state institutions and increasing economic development, these initiatives produced social and environmental crises and changed local community dynamics and state and society relationships (Haines 2010; Baker 2005; Mosse 2003; Gelles 2000; Lansing 1991; Wittfogel 1981). This research, however, has primarily focused on economic development at the national level but does not address the relationship between state building processes and the development of municipal water services. Third, scholarship on the histories and dynamics of municipal water services in colonial and post-colonial eras suggests that elite and capitalist interests and western models of urbanization strongly shaped the evolution and dynamics of municipal water services (Kaika 2005; Joyce 2003) in ways that resulted in unequal access to water among urban residents (Dill and Crow 2014; Kooy and Bakker 2008b; Kooy and Bakker 2008a; Gandy 2006; Swyngedouw 2004; Swyngedouw 1997). This research, however, does not attend to the political dynamics of state building. It is important to consider municipal water services evolved alongside national water sector development because of the critical role central governments played in the modernization process throughout the global South.

Fourth, researchers have also documented the creation, implementation, and immediate impacts of privatization and corporatization of municipal water services (Bakker 2010; Larner and Laurie 2010; Goldman 2007; Swyngedouw 2005). This scholarship shows that poor management practices, financial deficits, and deteriorating ecosystems (Swyngedouw 2005; Bakker 2003b) helped justify privatization programs throughout many cities in the global South to the detriment of municipal water services (Harris, Goldin, and Sneddon 2013; Bakker 2010; McDonald and Ruiters 2005; Swyngedouw 2005; Bakker 2003a; Shiva 2002). The extensive research on privatization of municipal water services, however, has largely failed to situate the dynamics of water management historically and deduce links between failures in the public and private sector management regimes. The historical relationship between state building and dynamics of municipal water services also provide a crucial context for understanding the dynamics and outcomes of privatization programs. Additionally, though researchers have extensively documented the ways that household access and autonomy over water governance are diminished through privatization programs (von Schnitzler 2008; Loftus 2006b; Smith 2004; Smith and Hanson 2003), researchers have not sufficiently considered how the design of municipal water systems shape household experiences with water access and use (Anand 2011), nor have researchers examined how public opinions about water sector reforms and perception of government and private sector institutions interact with regime security concerns.

Collectively, these bodies of literature help clarify the entangled challenges underlying Amman's municipal water services and Jordan's national water sector, and how these shape household perceptions and experiences. In some ways, this dissertation

affirms claims made by Swyngedouw (2004), Bakker (2010), and Linton (2010) that water management should be seen as a process that unites social, economic, political, and ecological factors in ways that influence decision-making institutions and processes and dynamics of access to water. This dissertation advances the debates around municipal and national water management, state building, and reform with four theoretical contributions.

First, economic, scientific, and engineering frameworks have been redeployed in the push to privatize and corporatize water sectors throughout the global South. While critical academics highlight the contexts within which reforms have been implemented and economic reasons for privatization, they do not carefully examine how these frameworks link water management crises and justify reform. Economic, scientific, and engineering frameworks were instrumental in building politically charged modernization programs, which often led to the degradation of environmental systems. Today, these frameworks depoliticize debates around privatization and corporatized water management through quantification of water supplies and demand forecasts. In the process, political and institutional constraints in resource management are treated as issues to be reformed through economic principles and more efficient engineering rather than as endemic characteristics of the water sector. Sound critiques of proposed water management reforms, therefore, must start with the framing of water management crises, particularly for how they simplify constraints and what these representations exclude.

Second, state building and the development of municipal water services have been, and continue to be, interrelated and interacting processes. State building processes strongly shaped the political economic and political ecological development of municipal

water sectors throughout the global South, and generated constraints to municipal and national water sector management. The financial, institutional, political, and supply/demand constraints are commonly experienced throughout the global South, hence the commonalities of privatization reforms implemented worldwide. The creation and evolution of these constraints, however, is path dependent. National and municipal water sector crises in Africa, Latin America, and Asia reflect the unique experiences with colonialism, modernization, donor involvement, and state/society relationships. Water sector institutions, therefore, must be situated within the histories of state building processes and development of municipal water services. This will shed light on the dynamic influence of institutional and political constraints on water management, and in turn, provide a basis for context-dependent water policy reforms.

Third, governance dynamics, and failures, express the ongoing transformations of various formal and non-formal institutions involved resource allocation and decision-making processes. Mainstream critics argue that privatization reforms fail because governments do not facilitate the success of governance as a decision-making process. Critical scholars, however, argue that governance debates tend to prioritize economic principles and priorities on services over equitable participation in water policy decisions. Both groups, however, do not acknowledge how governance dynamics reflect historical imprint of historical political, social, cultural, and economic factors on formal and non-formal institutions. This imprint has changed over time through development programs and reform initiatives, and in the process been shaped by institutional and political constraints. Indeed, even if water policies are designed with attention to context, failing to understand how and why formal and non-formal institutions interact will lead to

continued inequalities in water access and consumption, in addition to unequal participation in decision-making processes.

Fourth, household experiences with municipal water systems are shaped by a combination of engineering, socio-economic conditions, and “soft-path” water policies. The engineering of municipal water systems interact with household socio-economic conditions to produce differential access and water use experiences. In particular, factors such as geography, modes of water access and storage, fixed infrastructure and connection costs, and variable water prices can lead to unequal water access even in the fairest water systems. Failing to understand these dynamics in the development of reform programs and water policies can force households to opt out of municipal water services in favor of non-formal, and often unhealthy, supply services. Further, household experiences have played a strong role in shaping perceptions of reform processes that have led to greater repression in some cases and postponement of critical reforms in others. As such, management regimes must attend to the household realities and the socio-economic constraints they face with respect to accessing water services.

In the case of Jordan, reform dynamics and outcomes of privatization have been shaped by the longstanding effects state building processes on the national and municipal water sectors. Since the early 1960s, Jordanian authorities, with donor support, sought to build water sector institutions with an eye towards regime security. This led to the creation and evolution of constraints that have shaped, and continue to shape, the water management processes and water sector institutions. The corporatization reforms today are interacting with these processes, thereby blurring the differences between the modernization and privatization eras. What is emerging is a unique mix of partially

corporatized, partially state-centered water management plagued by conflicting priorities and tensions within the water sector.

Ultimately, authorities wish to create sustainable, adaptive, and resilient municipal and national water systems capable of addressing the persistent challenges plaguing the water sector since independence. By the end of 2014, however, a series of challenges related to access to cheap energy and the Syrian refugee crisis have set back reform programs generally, and specifically the ISSP. Granted, Jordan's context has radically changed since corporatization reforms began in 1999 and the ISSP's inception in 2011. These challenges, however, are not new. Rather, they have heightened the impacts of institutional and political constraints in municipal and national water management. Jordanian authorities are not interested in raising prices, reconfiguring institutional responsibilities, or reducing the central government's political influence over the water sector because of fears of public unrest. This reluctance towards reform is longstanding, rooted in the history of state building and the desire for regime security, and in the process institutionalized constraints in the water sector. Authorities could more appropriately deal with these constraints by democratizing the reform process and exercising transparency about the water sector's struggles.

Nevertheless, the corporatization process appears to be charging ahead. In spring 2015, USAID is expected to tender a second round of corporatization programs for Jordan's water sector. One expert in the water sector industry believes USAID is unhappy with the ISSP's progress on institutional restructuring (Policymaker Seventeen 2014). The tender was supposed to be released in fall 2014, but IRG's contract was extended until fall 2015. USAID's frustration with the ISSP and the extension of IRG's contract

thus stand at odds. The expert suspects that USAID postponed the tender because the current minister wishes to restrict the second round of reforms to building capacity in the water utility companies and improving the state of water sector infrastructure while excluding a more politically contentious overhaul of the water sector's governance systems, such as the water law and tariff reform.

This claim reinforces the importance of asking why Amman has been a continued target of reform and development projects. One perspective is that the previous projects failed because of poor implementation. This perspective reiterates mainstream economic and engineering frameworks that depoliticize the water sector. The second perspective is that institutional and political constraints inherent to its designs and operations means that reforms will always have to be on the table. The nature of water management and future prospects are always and necessarily politically-shaped by social, cultural, economic, engineering, and ecological factors, and, consequently, always under consideration of reform. The main issue is that problems such as non-revenue water rates, financial deficits, rising demand, low supplies, and other policy, economic, and engineering issues are not expressions of inadequately designed projects or poor implementation. Rather, they are symptoms of a more general crisis associated with the political and institutional design of the water sectors operations.

Over the past fifty years, projects have addressed these issues without attending to the conditions that produced the crises in the first place. As such, the debates over public, private, or public-private management paradigms require reconsideration as past and current management regimes are inherently linked by the constraints endemic to the water sector. The political concerns of the Jordanian government, and in particular the

strong influence of the Council of Ministers, cannot be dismissed nor can they be re-engineered by the creation of institutions, like the National Water Council, that streamline politically charged debates. Similarly, the imbricated development of municipal water services in Amman and state building priorities cannot be separated from regime security, rent-seeking through foreign financing, or prioritizing public appeasement. The same holds true for debates about the production of water supplies, development of municipal and national water infrastructure and transfer schemes, and the allocation of water to different sectors of the economy. These are not factors that get in the way of good management or governance. They are part and parcel of the managerial and governance contexts.

This does not mean there is no hope for moving forward or that efforts should not be made for changing the status quo. Rather, this is a call for considering the fact that politics has been part and parcel of the development process at every point in the sector's history at both the municipal and national levels. The social sciences, and geographers in particular, can play a crucial role in detailing the historical evolution and outcomes of water management and sector development in urban areas and at the national level. Additional research is needed to better understand the relationship between the political economy of urbanization and the development of municipal water services under privatization. It is somewhat surprising that scholarship on state building and the emergence and creation of municipal water services has not been more closely examined by scholars of the political economy of privatization in urban water services.⁵ Engaging the two bodies of scholarship provides an avenue for taking the contribution of social

⁵ There are a few exceptions (Kooy and Bakker 2008b; Gandy 2006; Loftus 2006a; Swyngedouw 2004).

scientists towards a more detailed understanding of how water sector crises are contextual and contingent. It also provides a unique avenue for participating in the mainstream debates in water management, which are primarily dominated by economists and engineers, in that comparative studies provide better understanding of how different contexts and constraints can interact to shape governance conditions.

Effective participation in mainstream debates, however, requires taking seriously mainstream analyses rather than merely deconstructing and dismissing them altogether. While it is important to bring a critical eye to the mainstream debates, it is also useful to use these debates as a starting point for discussion. The fact is that effective water management, engineering, and the application of economic frameworks require strategic simplification. Unfortunately, social scientists are often on the “outside looking in” rather than participating in the debates directly. Part of the problem rests with the fact that mainstream analysts often dismiss social science critiques. The other part, however, is that social scientists generate inaccessible critiques, which ultimately shapes their capacity to engage with water policy makers. It can be stated with a high degree of certainty that many policymakers in Jordan and internationally will not understand the “hydro-social cycle” because it does not resonate with their worldview. In the writing of this dissertation, there has been a concerted effort to avoid such terminology out of fear that it may be construed as jargon by those unfamiliar with the critical debates in the social sciences. The worldview of economists and engineers is indeed hegemonic and will not change in the near future.

Limitations of the Study and Directions for Future Research

There are, of course, several limitations to this study. First, for reasons related to capacity, time, and finance, the study does not address the Jordan Valley Authority's (JVA) role in the water sector. The JVA has been a critical part of the state building process since independence, as discussed earlier in the dissertation. Today, it is the key institution overseeing water production, management, and allocation in the Jordan Valley. Examining the role that the JVA plays in shaping water management dynamics at the municipal and national level would have greatly expanded the scope of this research. Doing so, however, would have required greater consideration of rural/urban tensions over water use. It also would have necessitated a more detailed and thorough assessment of the dynamic relationship between Jordan, Israel, and Palestine. Future research should address how institutions like the JVA have shaped and continually reshape the context within which water management is implemented. It is clear that water services at both the national and municipal scales link together many variables, many of which bring their own unique political and institutional challenges.

Second, the study would benefit from a multi-city comparison. Amman's municipal water services are closely linked to WAJ operations elsewhere in the country through extensive water transfer programs. Additionally, the model of the private management contract and limited liability companies provide institutional precedence for future corporatization processes in Jordan's municipal water services. Future research, therefore, should examine how Miyahuna compares to the corporatized utility in Aqaba and to WAJ-operated municipal water services in other cities such as Ma'an, Tafileh, or Karak. A multi-city study would provide a deeper understanding of the capacity for

utilities to succeed under various institutional and political contexts in addition to providing needed evidence on whether or not corporatization is indeed the best path for Jordan's municipal water services.

Third, the study would benefit from a comparison with other mid-sized cities experiencing similar challenges to municipal water services. Regionally, such cities could include Damascus, Beirut, or Tunis. Other cities from the global South should also be considered. Indeed, there is a tendency in academic literature to offer blanket critiques of privatization and corporatization processes when the empirical evidence suggests that the implementation of such programs and their outcomes are much more diverse. Such a comparison, furthermore, would also generate critical evidence that could be used to challenge many of the "laboratory experiments" in privatization advanced by the International Monetary Fund and the World Bank. For obvious reasons, a multi-city comparison would have been impossible to complete over the last two years, but it does provides a basis on which future studies can be modeled.

Fourth, more household interviews and more diverse interview participants could bolster the arguments offered in the dissertation. Of the households agreeing to participate in interviews, only five of the twenty-three were conducted with females or included female participation. For many families, it is considered taboo for a mother or daughter to sit with a young man like myself without a male figure present. Most households did not restrict female participation explicitly, but I also framed the request for interviews to provide households with the autonomy to decide on who will participate. The study would also have benefited from follow up interviews with the

households in order to clarify answers and ask new ones, though time constraints prevented this.

Related, the GIS analyses in this study would also benefit from population data rather than customers billed. Households sharing a water meter are treated as one customer. More accurate data about average household bills and water consumption could be generated with specific population data for each sub-district. Further, household proximity to the location of water towers and underground reservoirs in the sub-districts, and more specific information of about the location of primary, secondary, and tertiary networks would shed further light on how these factors shape water consumption throughout Amman. A longer time-series predating the privatization process would also allow for a better comparison between WAJ, LEMA, and Miyahuna. Unfortunately, Miyahuna and WAJ did not make these datasets available for security reasons and population data was not readily available. Nevertheless, Chapter Five demonstrates the benefits of combining GIS analyses with household interviews. Future research on urban water governance dynamics should seriously consider how GIS and statistical analyses might enhance insights and generate interesting questions for the household interviews.

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Appendix I: Household Interviews

Interview	Location	Identity	Date
Interview 1	Airport Road	Jordanian Palestinian Origin	May 19, 2013
Interview 2	Um Uthaina	Iraqi Refugee	November 15, 2012
Interview 3	Bayadir	Jordanian Palestinian Origin	June 22, 2013
Interview 4	Jabal Nadhif	Jordanian Palestinian Origin	February 2, 2013
Interview 5	Dahyet Al-Ameer Hassan	Jordanian Palestinian Origin	February 6, 2013
Interview 6	Hay Nazzal	Jordanian Palestinian Origin	February 10, 2013
Interview 7	Sahab	Jordanian Palestinian Origin	February 13, 2013
Interview 8	Jabal Nadhif	Jordanian Palestinian Origin	February 15, 2013
Interview 9	Hashemi Shamali	Jordanian Palestinian Origin	May 25, 2013
Interview 10	Ashrafiyeh	Iraqi Refugee	May 18, 2013
Interview 11	Weibdeh	Jordanian Palestinian Origin	May 20, 2013
Interview 12	Jabal Amman	Jordanian	May 11, 2013
Interview 13	Wehdat	Jordanian Palestinian Origin	June 4, 2013
Interview 14	Abu-Nusseir	Iraqi Refugee	June 26, 2013
Interview 15	Marka	Iraqi Refugee	May 29, 2013
Interview 16	Marka	Jordanian Palestinian Origin	June 3, 2013
Interview 17	Jabal Amman	Jordanian	May 30, 2013
Interview 18	Um Uthaina	Jordanian	December 6, 2012
Interview 19	Dabouk	Jordanian Palestinian Origin	June 13, 2013
Interview 20	Abdoun	Jordanian Palestinian Origin	April 3, 2013
Interview 21	Jabal Amman	Syrian Refugee	April 15, 2013

Appendix II: Key Informant Interviews

Interview	Institution	Title	Date
Policymaker 1	Jordan Water Company Miyahuna	Technical Director	December 12, 2012
Policymaker 2	Millennium Challenge Account and Yarmouk Water Company	Project Directors	October 23, 2012
Policymaker 3	Eco Consult and International Resources Group	Utility and Institutional Strengthening Advisor and Team Leader	June 18, 2012
Policymaker 4	International Resources Group	Regulatory Senior Advisor	December 7, 2012
Policymaker 5	Jordan Water Company Miyahuna	Planning and Investment Department Manager	February 6, 2013
Policymaker 6	Water Authority of Jordan	Former Secretary General	April 7, 2013
Policymaker 7	Jordan Water Company Miyahuna	Communications and Water Awareness Manager	January 22, 2013
Policymaker 8	Water Authority of Jordan	Director of Performance Management Unit	June 13, 2013
Policymaker 9	EcoConsult	Managing Director	May 12, 2013
Policymaker 10	Ministry of Water and Irrigation	Former Minister	May 12, 2013
Policymaker 11	Ministry of Water and Irrigation	Director of Water Demand Management Unit	April 18, 2013
Policymaker 12	EcoConsult	Technical Manager Water Supplies and Utilities	June 12, 2013
Policymaker 13	Jordan Water Company Miyahuna	Customer Services Director	January 27, 2013
Policymaker 14	Ministry of Water and Irrigation	Former Minister	June 3, 2013

Policymaker 15	Ministry of Water and Irrigation	Secretary General Assistant Technical Affairs	May 5, 2013
Policymaker 16	Engicon	Chairman	May 30, 2013
Policymaker 17	AECOM	Senior Water Manager	September 12, 2014
Policymaker 18	Mercy Corps	Jordanian	December 6, 2012
Policymaker 19	Jordan Water Company Miyahuna	Senior Research and Development Analyst	October 10, 2012

Appendix III: Interview Protocol

Policymaker Interviews

1. Can you describe your work or responsibilities in the water sector?
2. What do you believe to be the most pressing issues in the water sector in general? What do you believe to be the most pressing issues in Amman's municipal water services?
3. Can you describe your perspective on the working relationship between the Ministry of Water and Irrigation, Water Authority of Jordan, and LEMA/Miyahuna? How has this relationship evolved over time? How do you think this relationship between the institutions and governance in general can improve?
4. Can you evaluate Jordan's transition to a more corporate-oriented water sector? What is the history of this transition? How did it start and why?
5. How do you assess the water sector's governance performance?
6. How has the water sector been affected by regional and domestic changes? How have these issues impacted reform?
7. What is your long-term diagnosis for the water sector? Why?
8. What is your opinion of the role of the minister? Does the frequent changes to the minister shape or affect the water sector? If so, how?
9. What role does public pressure play in water management?
10. How does politics shape water management?
11. What would you reform or change in the water sector, and why?

Household Interviews

1. Do you rent or own your home? Where do you live?
2. Can you please describe your water capacity at home? How much do you pay for water? Are you willing to pay more?
3. What is your experience with Miyahuna's services?
4. What is your perception of the water sector and services? Are you satisfied or is there room for improvement? How can they improve?
5. In the last 10 to 15 years, do you feel that municipal water services have improved? If so, why? If not,
6. What communication do you have with the water sector? Do you receive public service announcements?
7. Have you ever relied on a private water truck? If so, why? What was your experience?
8. Do you feel there is a crisis in the water sector? What drives the crisis?
9. How does the intermittent distribution system affect you? How often do you receive water? How do you store water? Do you face problems with water access and storage? If so, what are these problems and what are their causes?
10. What is your opinion about privatization in the water sector? Are you familiar with reform initiatives? If so, how do you feel about these reforms?