Assessing the Governance and Designing a Successful Utility Reform for Jerusalem Water Undertaking

M.Sc. Thesis

Birzeit University
Faculty of Graduate Studies
Water and Environmental Engineering Masters Programme

Master's Thesis Submitted By
Nibal Najjar
(Student No. 1095414)

Supervised By
Dr. Nidal Mahmoud

2018

BIRZEIT UNIVERSITY

تقييم الحوكمة وتصميم برنامج إصلاح ناجح لمصلحة مياه محافظة القدس
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This thesis was submitted in partial fulfillment of the requirements for the Master's Degree in Water and Environmental Engineering from the Faculty of Graduate Studies, at Birzeit University, Palestine.

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Submitted by

Nibal Najjar

This thesis was prepared under the main supervision of Dr. Nidal Mahmoud and has been approved by all members of the examination committee. The thesis defense date was on 2nd January 2018.

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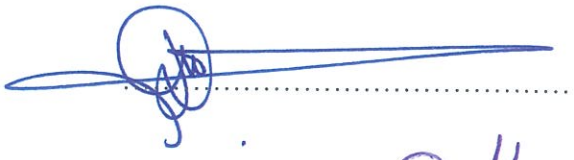

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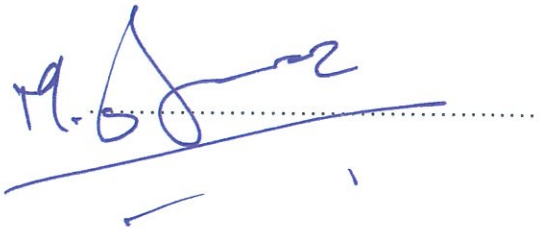

The findings, interpretations and the conclusions expressed in this study do not necessarily express the views of Birzeit University, the views of the individual members of the MSc. Committee or the views of their respective employers.

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Abstract

Successful public utilities are exception. Many water and sanitation utilities around the world are locked in a vicious cycle of declined performance and deteriorated assets which are generally the consequence of misdirected and ineffective policies, poor governance, and the monopolistic nature of the sector.

Jerusalem Water Undertaking (JWU) is a regional water utility in Palestine established in 1966 that serves at present a significant part of Ramallah and Al Bireh Governorate, and other communities north of Jerusalem. It is financially and administratively independent and is governed by its own board of directors. And there is a medium to long term vision that the JWU service area will extend over the entire two governorates of Jerusalem and Ramallah & Al Bireh. Recently, in 2011, it was decided by the Council of Ministers to upgrade JWU by widening its mandate to sanitation services. The integration of water and sanitation services has led to a need to reconfigure JWU. This transition coincides with implementation of a comprehensive reform plan for the Water Supply and Sanitation (WSS) Sector in Palestine, whereby JWU would play a crucial role in.

The purpose of this study is to assess the governance of JWU and design a successful utility reform of JWU by combining measures, with utility-focused steps, to improve the institutional environment and its interaction with the utility and to strengthen its internal functioning to enable it to efficiently expand its mandate to sanitation services and increase its scale and its geographical coverage. This work can be considered as a real start in JWU reform process triggered by the new mandate of JWU and a leadership at the utility level to contribute to the public sector reform agendas in a best-fit approach.

The research will make use of the governance assessment tool and the utility analytical framework developed by the World Bank. This analytical framework is grounded on the principles of New Public Management (NPM) which is a direction in public sector reform that focuses on outputs. The analytical framework combines two principal perspectives. The first deals with the “external environment”, describing the institutional, economic, and social context in which the service provider operates. The second deals with the “internal functioning of the utility”, mostly oriented toward decision-making processes and management practices, and encompasses issues such as financing, strategic planning, management information systems, human resource management, etcetera. For

this, the framework uses various indicators proposed for assessing the dimensions of well-run utility: (i) external autonomy; (ii) external accountability; (iii) internal accountability for results; (iv) market orientation; (v) customer orientation; and (vi) corporate culture.

The results of this research were drawn from a mixture of various sources, which included a desk review of literature including extensive review of public water utilities case studies, field research of the case study JWU, analyzing operational experience from professionals in the sector, and extensive participation in meetings with the relevant stakeholders in the sector.

The diagnostic findings reveal that JWU has the capacity to initiate and absorb change related to the aggregation in terms of scope and scale which would involve taking over municipal wastewater departments nearby and the other smaller service providers, often underperforming and with significant infrastructure investments. The findings also indicated that the political economy is favorable with good prospects for the continuation of the present momentum of the JWU-donor-stakeholders collaboration towards reform. And in the core of the findings is that JWU has the characteristics of well-performing utility for the success of the process. However, some reform actions are required for further strengthening JWU in preparation to the aggregation process.

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الخلاصة

تعتبر المرافق العامة الناجحة استثناء. فالكثير من مرافق المياه والصرف الصحي في جميع أنحاء العالم محبوسة في حلقة مفرغة من الأداء المتدهور والأصول المتدهورة التي تكون عادة نتيجة لسياسات خاطئة وغير فعالة، وسوء الحكم (الحوكمة)، والطبيعة الاحتكارية للقطاع.

مصلحة مياه محافظة القدس هي مرفق مياه إقليمي في فلسطين تأسست في عام 1966 وتخدم في الوقت الحالي جزءًا كبيرًا من محافظة رام الله والبيرة وبعض التجمعات الأخرى شمال القدس. وهي مستقلة ماليا وإداريا ويحكمها مجلس إدارة خاص بها. وهناك رؤية متوسطة إلى طويلة المدى لتوسيع منطقة خدمة المصلحة لتمتد إلى كامل محافظتي القدس ورام الله والبيرة. مؤخرا، في عام 2011، قرر مجلس الوزراء تطوير مصلحة مياه محافظة القدس من خلال توسيع نطاق خدمتها إلى خدمات الصرف الصحي. أدى دمج خدمات المياه والصرف الصحي إلى الحاجة إلى إعادة تشكيل مصلحة مياه محافظة القدس. يتزامن هذا الانتقال مع تنفيذ خطة إصلاح شاملة لقطاع المياه والصرف الصحي في فلسطين ، حيث ستلعب مصلحة مياه محافظة القدس دوراً هاما فيها.

الهدف من هذه الدراسة هو تقييم الحوكمة وتصميم برنامج إصلاح ناجح لمصلحة مياه محافظة القدس من خلال الجمع بين تدابير، مع خطوات تركّز على المصلحة، لتحسين البيئة المؤسسية وتفاعلها مع المصلحة وتعزيز أدائها الداخلي لتمكينها من توسيع نطاق خدمتها بشكل فعال إلى خدمات الصرف الصحي وزيادة حجمها وتغطيتها الجغرافية. يمكن اعتبار هذا العمل البحثي بمثابة بداية حقيقية في عملية إصلاح مصلحة مياه محافظة القدس الناجمة عن تولّي المصلحة نطاق الخدمة الجديد وقيادة على مستوى المصلحة للمساهمة في جداول أعمال إصلاح قطاع المياه والصرف الصحي وفق نهج الأكثر ملائمة.

سوف يستخدم البحث أداة تقييم الحوكمة والإطار التحليلي للمرافق الذي طوّره البنك الدولي. ويرتكز هذا الإطار التحليلي على مبادئ الإدارة العامة الجديدة التي هي اتجاه في إصلاح القطاع العام الذي يركز على المخرجات. يجمع الإطار التحليلي بين منظورين رئيسيين. يتناول الأول "البيئة الخارجية"، ويصف السياق المؤسسي والاقتصادي والاجتماعي الذي يعمل فيه مقدم الخدمة. ويتناول الثاني "الأداء الداخلي للمرفق"، الذي يتجه في الغالب نحو عمليات صنع القرار وممارسات الإدارة، ويشمل قضايا مثل التمويل، والتخطيط الاستراتيجي، ونظم المعلومات الإدارية، وإدارة الموارد البشرية، وما إلى ذلك. ولهذا، يستخدم الإطار مؤشرات مختلفة مقترحة لتقييم الأبعاد التالية الخاصة بالمرفق الناجح: (1) الاستقلال الذاتي الخارجي؛ (2) المساءلة الخارجية؛ (3) المساءلة الداخلية عن النتائج؛ (4) التوجه نحو السوق؛ (5) التوجه نحو العملاء؛ و (6) ثقافة الشركة.

تمّ استخلاص نتائج هذا البحث من خليط من مصادر مختلفة، والتي تضمنت مراجعة مكتبية للأدبيات بما في ذلك مراجعة شاملة لدراسات لحالة االخاصة بمرافق المياه العامة، والبحوث الميدانية لدراسة الحالة الخاصة بمصلحة مياه محافظة القدس، وتحليل الخبرات التشغيلية من المهنيين في القطاع، والمشاركة الواسعة في الاجتماعات مع أصحاب العلاقة المعنيين في قطاع المياه والصرف الصحي في فلسطين.

تكشف النتائج التشخيصية أن مصلحة مياه محافظة القدس لديها القدرة على بدء واستيعاب التغييرات المتعلقة بالتجميع (الدمج) على مستوى النطاق والحجم التي من شأنها أن تشمل الاستحواذ على الدوائر البلدية للصرف الصحي المجاورة ومقدمي الخدمات الأصغر الآخرين، التي كثيراً ما يكون أداؤها ضعيفاً ومع وجود استثمارات كبيرة في البنية التحتية. وأشارت النتائج أيضا إلى أن الاقتصاد السياسي مواتٍ مع وجود آفاق جيدة لاستمرار الزخم الحالي للتعاون بين المصلحة والجهات المانحة وأصحاب العلاقة من أجل الإصلاح. وفي جوهر النتائج، أن مصلحة مياه محافظة القدس تمتلك خصائص المرفق الناجح لنجاح العملية. ومع ذلك، فإن بعض إجراءات الإصلاح مطلوبة لزيادة تعزيز مصلحة مياه محافظة القدس في التحضير لعملية التجميع.

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Dedication

To my adorable parents, my ideal mama "Basema" and my faithful baba "Fawzi"…

To my amazing brothers and sisters …

To my wonderful family …

To my homeland, Palestine …

To Jerusalem Al Quds…

To my hometown, Yaffa …

To Birzeit University …

To my workplace, JWU …

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بسم الله الرحمن الرحيم والصلاة والسلام على سيدنا محمّد والحمد لله في الأول وفي الآخر

(سورة يوسف، آية 64)

Again and again, my greatest thanks and gratefulness to my parents for their continuous support, endless love, non-stopping giving and encouragement. They have been my source of inspiration, strength and courage. I owe them everything! Special thanks to my lovely brothers and sisters and to their families my big family.

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Abbreviations

CARL	Current Annual Real Losses
CMWU	Coastal Municipal Water Utility
GIS	Geographic Information System
IEWS	Institute of Environmental and Water Studies
IWSR	Institutional Water Sector Review
JSC	Joint Service Council
JWU	Jerusalem Water Undertaking
KfW	KfW Entwicklungsbank (German Development Bank)
LGU	Local Governement Unit
lpcd	liter per capita per day
MCM	Million Cubic Meters
MDG	Mellinium Development Goals
MDLF	Municipal Development Lending Fund
MIC	Ministerial Infrastructure Committee
MOA	Ministry of Agriculture
MOFP	Ministry of Finance and Planning
MOL	Ministry of Labor
MOLG	Ministry of Local Government
MOU	Memorandum of Understanding
NGO	Non Governmental Organization
NPM	New Public Management
NRW	Non Revenue Water
NWC	National Water Company
O&M	Operation and Maintenance
OCHA	Organisation for the Coordination of Humanitarian Affairs
OPEX	Operational Expenditure
PA	Palestinian Authority
PEA	Project Executing Agency
PS	Palestinian Standard

PSP	Private Sector Participation
PSR	Public Sector Reform
PVC	Polyvinylchloride
PWA	Palestinian Water Authority
RC	Refugee Camp
RWU	Regional Water Utility
SDG	Sustainable Development Goals
SP	Service Provider
UAAL	Unavoidable Apparent Losses
UARL	Unavoidable Real Losses
VAT	Value Added Tax
WBWD	West Bank Water Department
WHO	World Health Organization
WSRC	Water Sector Regulatory Council
WSS	Water Supply and Sanitation
WUA	Water Users Association
WWTP	Wastewater Treatment Plant

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Chapter 1

Introduction

1.1 General

Good governance and effective utility management are principal contemporary dimensions of water supply and sanitation (WSS) service provision which affects access to adequate water supplies, quality of service and performance of operations, especially that water supply and sanitation sector is a non-competitive industry (Jiang *et al.*, 2010) with natural monopolies, and markets are institutional options (Brewer *et al.*, 2007).

Market failures—natural monopoly, externalities, and public good characteristics—are the prime justifications for public provision of WSS. Urban water supply and sanitation services have commonly been provided by state-owned, monolithic water organizations (Baietti *et al.*, 2006). And, too often the functions of policy formulation, regulation of the WSS service, ownership of assets, financing of WSS infrastructure development and provision of WSS service are governed by unclear and unenforceable mandates and/or contracts (Locussol *et al.*, 2010).

In the past decades, many governments have tried to make state-owned water utilities more efficient but few have succeeded in turning around their utilities into viable and effective organizations. Since the 1950s there have been several waves of reforms. The most recent one—in the 1990s—had a strong focus on private sector participation (Ginneken *et al.*, 2008).

While private sector involvement has indeed increased in the last decade, it has substantially fallen short of expectations that it would help turn around this sector. At the same time, some public utilities have become more autonomous and accountable (Baietti *et al.*, 2006). Moreover, the major transition of most utilities in the past decades has not been from public to private operation, but from centralized to decentralized public provision (Ginneken *et al.*, 2008).

Today, there is a very good understanding that past reform interventions and approaches will not work. Partly because of the fact that efforts were tremendously focused on changing the utility by strengthening its management and its processes, but without making commensurate advances on the governance framework or the institutional environment in which the utility operates (Baietti *et al.*, 2006).

In Palestine, water supply and sanitation (WSS) services are provided by institutions that are varying in their legal status, ownership structure, and management of the service. The wide range of existing organizational models includes departments embedded within municipalities, independent utilities, and local committees and village councils. Their performance varies from very poor to good.

Jerusalem Water Undertaking is a regional utility that serves a significant part of Ramallah and Al Bireh Governorate including the cities of Ramallah, Al Bireh and the surrounding villages, and other communities north of Jerusalem. It is financially and administratively independent and has its own board of directors. It is widely considered as the best managed water supply utility in Palestine (World Bank, 2009).

Recently, it was decided by the council of ministers to upgrade JWU by widening its mandate to wastewater services (Ministerial decree 13/107/14, October 2011). The integration of water and wastewater services has led to a need to reconfigure JWU. This transition coincides with implementation of a comprehensive reform plan for the water supply and sanitation (WSS) sector, whereby JWU would play a crucial role in. The current prominence of water sector reform in the Palestinian Water Authority is a relatively recent feature of its agenda. The reform plan of the Palestinian Water Authority (PWA) was adopted by the Council of Ministers in December 2009 by means of Legislation No. 13/13/04 (PWA, 2011).

The purpose of this study is to design a successful utility reform of JWU by combining measures, with utility-focused steps, to improve the institutional environment and its interaction with the utility and to strengthen its internal functioning to enable it to efficiently expand its mandate to wastewater services. This work can be considered as a real start in JWU reform process triggered by the new mandate of JWU and a leadership at the utility level to contribute to the public sector reform agendas in a best-fit approach.

1.2 General Statement of the Problem

Successful public utilities are exception. Many water and wastewater utilities around the world are locked in a vicious cycle of declined performance, deteriorated assets due to insufficient funding for maintenance, low willingness of customers to pay cost recovery tariff, institutional discrepancies and high incidences of political interferences. Figure 1-1 illustrates this downward cycle which is generally the consequence of misdirected and ineffective policies, poor governance, and the monopolistic nature of the sector.

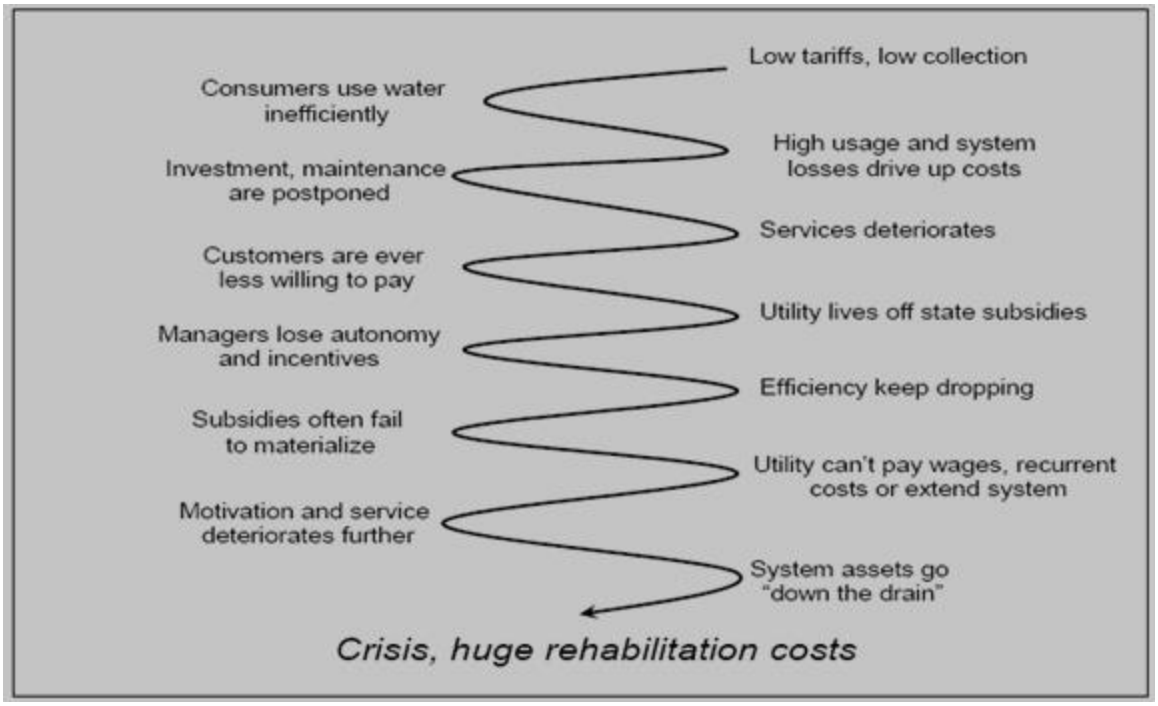

Figure 1-1 The Vicious Spiral of Performance Deterioration of Utilities (after Baietti *et al.*, 2006)

The Specific Challenges of Public Water Utility is "How would well-performing utilities break this vicious spiral by engaging the different stakeholders?"

1.3 Thesis Aim

The research aims to better understand the conditions and requirements for successful utility reform with focus on Jerusalem Water Undertaking as a case study.

The Main Research Question to be assessed is to determine:

"How can we assess the governance and design a successful utility reform of Jerusalem Water Undertaking?"

1.4 Objectives

The research specific objectives are to:

- Analyze the political economy surrounding the WSS sector and how it influences the functioning of JWU;

- Assess the governance of JWU and identify key stakeholders that need to be engaged in the reform process;
- Define the critical dimensions of a well-run water utility, including financial viability, optimizing efficiency and accountability, and customer orientation; and assess the performance of JWU with respect to the dimensions of successful utility: autonomy, accountability, and market and customer orientation;
- Assess the functioning of the utility, diagnose performance gaps, and analyze past and future reform paths;
- Determine the stages of reform, and explain some of the key components of an effective, multi-stage reform process, incorporating communication strategies to ensure ongoing, wide-spread support for change.

1.5 Thesis Hypothesis

JWU is run as modern utility and has the characteristics of well-performing utility, and thereby has the capacity to initiate and absorb change related to the aggregation in terms of scope and scale which would involve taking over municipal wastewater departments nearby and the other smaller service providers, often underperforming and with significant infrastructure investments.

1.6 Significance of Research

This study should be seen as a one to build knowledge needed to operationalize the approaches of utility reform. In addition, this case study aimed to help policy makers and utility managers as well as those who interact with them (donors, staff, consultants and civil society leaders) in defining and implementing reforms, especially at the local level.

1.7 Research Outline

The report has been outlined in the following manner:

Chapter 1 Introduction

Chapter 2 Literature Review
Theoretical Framework
Case Studies on Utility Reforms

Chapter 3 Approach and Methodology

Chapter 4 Case Study Description

Chapter 5 Results and Discussion

Chapter 6 Conclusions and Recommendations

Chapter 2

Literature Review

The objectives of the literature review chapter are to develop a framework about the key topics addressed in the reform of the water supply and sanitation sector and look at the global experience in utility reform.

2.1 Types of Reforms/ Utility Market Reforms

The utility sectors of water, electricity, gas, and telecommunications present in common a set of political and economic issues and they have been subject to a wide range of reform measures. The main types of reforms undertaken in utilities are characterized by (Foster *et al.*, 2005) as follow:

2.1.1 Public Sector Reform (PSR)

Traditionally, utility services have been provided by "state-owned utilities". This has led to much political interference, also known as "clientelism", resulting in undesirable effects of overemployment, low tariffs, manipulated investments priorities and depressed managerial and financial autonomy. Many governments introduced a number of measures for enhancing the autonomy and the financial viability of the utilities within the context of "public sector" service provision. This includes corporatization of public utilities, ring-fencing of financial accounts, and governance reforms for increasing the independence of the board or changing the legal status of the institution to have its own procurement, personnel and investment regulations. Such reforms have become less frequent in the 1990s when the wave of private sector participation (PSP) took place. Nonetheless, they more and more are being reconsidered in sectors and countries as feasible option than the PSP.

2.1.2 Private Sector Participation (PSP)

PSP is a deep institutional reform of public utilities. It has a wide spectrum of contractual forms that depends on the extent of responsibilities and associated risks that are

transferred from the public to the private sector. The range varies from contracting certain operational functions to full transfer of the ownership of assets. The political and economic conditions of the country and the nature of the sector are determinant factors for private sector investments. The social and distributional impacts of the PSP vary as well according to the selected form of PSP and the specific context in which being implemented.

2.1.3 Regulatory Reform

Regulatory reform involves insulating of the utility operators from political interference and thereby strengthening their accountability framework. Historically, having the public utilities been self-regulated has led to poor performance due to low accountability. Legal framework is a backbone for regulatory reform and often results in institutional separation of the regulatory function from both the Government and the utility by creating an independent regulator. Tariff and service quality regulations are the two main components of any regulatory reform. Tariff regulation requires that tariffs are set to reflect the efficient costs of service provision, with adjustment mechanisms to reflect changes in these costs over time (Foster *et al.*, 2005). Quality regulation typically defines specific quality targets, sets up a system for monitoring quality performance, and establishes sanctions for performance deficiencies (Foster *et al.*, 2005). Regulatory reform remains valid as a tool for enhancing the performance of the public utilities, and is an absolute necessity for introducing PSP.

2.1.4 Sector Restructuring

Sector restructuring can be vertical or horizontal. Under vertical restructuring, institutional responsibilities for different production stages in certain process are changed. For instance, when the functions of generation, transmission and distribution are separated from one electric utility and tasked to three distinct utilities. Under horizontal restructuring, the number of units responsible for a given stage of service provision is reduced or (more typically) increased. For instance, when the assets of electric generation of one national company are subdivided and assigned to four distinct companies (Foster *et al.*, 2005). Centralization and (more typically) decentralization reforms lie under horizontal restructuring as special cases. Centralization and decentralization reforms involve the alteration of the geographical boundaries of service provision to reflect the structure of different tiers of government (Foster *et al.*, 2005).

2.1.5 Market Liberalization

Most utility services are natural monopolies. Examples are water and electricity distribution because of their infrastructure networks. Nonetheless, reforms by introducing competition in other subsectors like long-distance telephone calls and electricity generation has been increasingly found feasible. Implementing measures of sector restructuring is often a preparatory step for market liberalization with the aim of separating and breaking up the market power of certain production chain components that

are most susceptible to competition. Informal and small-scale providers in the case of the water sector are sort of market liberalization.

In fact, reform package will consist of a number of these measures at the same time. However, it varies considerably from one utility sector to another.

2.2 Impacts of Reforms

Each utility reform of the above-mentioned five types can have a wide range of impacts. It was analyzed by (Foster *et al.*, 2005) that the various types of utility reform affect the following variables:

- Asset ownership
- Price of service
- Access to service
- Employment and wages
- Quality of service
- Fiscal flows

Table 2-1 summarizes how utilities reform per type can be expected to yield impacts.

Table 2-1 Summary of Expected Impacts of Different Types of Utility Reform (after Foster *et al.*, 2005)

	Employment and Wages	*Price of Service*	*Quality of Service*	*Access to Service*	*Asset Ownership*	*Fiscal Flows*	*Entry Conditions*
Public Sector Reform	Employment *may*[a] fall because of increased pressure for efficiency	Prices *may* adjust upward or downward toward efficient cost-reflective levels	Quality *may* improve because of better management	Access *may* improve because of improved finances	n.a.	Subsidies to the sector *may* be reduced	n.a.
Private Sector Participation	Employment *should*[b] fall because of increased pressure for efficiency	Prices *should* adjust upward or downward toward efficient cost-reflective levels	Quality *may* improve because of better management	Access *may* improve because of improved finances	Asset sales increase private ownership, concentration depends on design details	Subsidies to the sector *should* be reduced, Sale revenues *may* be large, and tax revenues *may* follow thereafter	n.a.
Regulatory Reform	Employment *may* fall because of increased pressure for efficiency	Prices *should* adjust upward or downward toward efficient cost-reflective levels	Quality *should* improve because of increased oversight and accountability	Access *should* increase because of oversight and accountability	n.a.	Subsidies to the sector *should* be reduced as tariffs converge to cost-reflective levels	Regulatory decisions *may* affect terms of competition between providers
Sector Restructuring	Employment *may* fall because of increased pressure for efficiency	n.a.	n.a.	n.a.	Decentralization transfers assets to subnational governments	Responsibility for subsidization *may* shift to subnational government	n.a.
Market Liberalization	Employment *may* rise because of sector growth, but wages may fall because of competition	Prices *should* fall because of competitive pressures	Quality *should* improve as a result of competition	Access *should* improve because of entry of new providers, and wider consumer choice	Private ownership increases because of entry of new operators	Entry fees *may* generate revenues, and tax revenues *should* increase	Liberalization *should* open up market for entry of new players

Note: n.a. = not available.
a may indicates possible impact.
b should indicates probable impact.

2.3 Water Sector Reforms

In the water sector, public service provision is the model in most of the cases (Foster *et al.*, 2005). It represents 90 percent of such services in the developing countries ((Muller *et al.*, 2008) and it is believed that the public sector will continue to play a key role in the future (Muller *et al.*, 2008). Depending on the political structure of the country, the service provision is decentralized either to the state or to the municipal level.

A number of measures may be taken to reform utilities within the public sector. Favorable government involvement is essential for their success (World Bank IEG, 2008). (Ehrhardt *et al.*, 2007) state that regulatory reform as part of the sector reform can help to improve services. On the other hand, (Foster *et al.*, 2005) mentioned that Private Sector Participation (PSP) has been an alternative in many cases with broad range of contractual forms including management contracts, lease contracts, build-operate-transfer schemes and concession contracts, although transfer of assets is comparatively unusual and regulation remains implicit or is incorporated into the contract. PSP has been highly implemented in higher and middle-income countries (Gunatilake *et al.*, 2008); however, the low-income countries experience is not encouraging.

(Estache *et al.*, 2006) conclude that privatization of the sector and greater autonomy of regulation have not all the time had the expected effects on services quality, access or affordability.

2.4 Stakeholders in Reform Process, among Winners and Losers

Utility reform has been deemed controversial from political and social points of view. It often help in improving the WSS services but it also involve tariff increases, transfer of assets and considerable layoff of employees (Foster *et al.*, 2005). As a result, the processes of utility reform will affect a number of stakeholders who have different and sometimes conflicting interests and even it will be strongly opposed by some constituencies (Foster *et al.*, 2005).

These stakeholder groups are:

- Consumers
- Workers
- Competitors
- Owners
- Government (State)

2.5 Governance

(Estache *et al.,* 2002) states that the institutional capacity of the country as well as the governance are main driving factors in the performance of each organization.

The term "Governance" refers to "the relationship between the owners, directors, and managers and the rules, laws, policies, and customs that define this relationship and ensure that the managers and directors are accountable to the owners for the pursuit of objectives consistent with those of the owners and that the entity complies with all laws and regulations" (Groom *et al.*, 2006).

Table 2-2 lists some definitions of governance extracted by (Halpern *et al.*, 2008) from the literature.

Table 2-2 Governance in Literature (after Halpern *et al.*, 2008)

Governance has been defined in literature as:
"The people, policies and processes that provide the framework within which managers make decisions and take actions to optimize outcomes related to their spheres of responsibility" (Australia Government Department of Finance and Administration-website)
"The exercise of political, economic and administrative authority in the management of a country's affairs at all levels…a neutral concept comprising the complex mechanisms, processes, relationships and through which citizens and groups articulate their interests, exercise their rights institutions and obligations and mediate their differences" (World Health Organization, based on UNDP definition)
"The process by which stakeholders articulate their interests, their input is absorbed, decisions are taken and implemented, and decision-makers are held accountable" (Bakker, 2003)

(Halpern *et al.*, 2008) found that the ultimate reason that cause water and sanitation providers fail to serve citizens is poor governance at the governmental, sectoral, and utility levels. Thereby good governance has been defined by (Halpern *et al.*, 2008) as "the presence of:

- General adherence to rule of law,
- Transparency, predictability, and accountability in government decision making,
- Decision-making that consistently achieves effective and efficient outcomes for society,
- Decision-making processes that consistently allow for public participation, responsiveness, consensus orientation, equity, and inclusiveness."

Besides, good governance has been considered by (Halpern *et al.*, 2008) as a central concept for any anti-corruption effort, but he added that achieving good governance will definitely solve more than corruption problems.

2.6 Policy

Policy as defined by (Elledge *et al.*, 2002) is "the set of procedures, rules, and allocation mechanisms that provide the basis for programs and services". Policies involve setting priorities and often allocation of resources needed for their implementation. (Elledge *et al.*, 2002) explained that "policies are implemented through four types of policy instruments:

- **Laws and regulations.** Laws generally provide the overall framework, and priorities and regulations provide the more detailed guidance. Regulations are rules or governmental orders designed to control or govern behavior and often have the force of law. Regulations for sanitation can cover a wide range of topics, including the practices of service providers, design standards, tariffs, discharge standards, environmental protection, and contracts. National agencies may also issue official guidelines that serve to define policies;
- **Economic incentives.** Such incentives are subsidies and may also include fines for unsafe disposal, emission charges, and user charges as a result of poor behaviors and practices;
- **Information and education programs.** These programs include public awareness campaigns and educational programs designed to generate demand and public support for efforts to expand sanitation services;
- **Assignment of rights and responsibilities for providing services.** National governments are responsible for determining the roles of national agencies as well as the appropriate roles of the public, private, and nonprofit sectors in program development, implementation, and service delivery."

2.7 Political Economy Analysis and Governance Assessments

Governance Assessment and Political Economy Analysis (PEA) are two types of analysis for the Water Supply and Sanitation (WSS) sector. They are two instruments that serve different purposes.

Depending on the questions addressed by the stakeholder carrying out or commissioning the analysis, either governance analysis or PEA will be the better approach for application (Harris *et al.*, 2011).

According to (Harris *et al.*, 2011) governance analysis or assessment is defined as "those forms of analysis that attempt to measure performance against certain pre-established criteria or characteristics of the state. In other words, governance analysis often takes the form of a gap analysis that starts with an idea of what institutions should look like (generally idealized versions of the institutions of developed Western countries) and compares actual performance to this to identify what is lacking. As a result, this type of approach has been characterized as focused on the prescription of an often narrow set of strategies targeted at variables seen to be in short supply (such as participation, transparency, or accountability). While improvements in such variables may be desirable

in their own right, strategies designed to achieve them have tended to focus on templates or blueprints which have not always engaged with realities of different contexts and have often failed to generate the change in developmental outcomes intended by donors."

In contrast, PEA is characterized by a different approach, "which takes the context as it exists as its starting point and then focuses on identifying feasible solutions" (Harris *et al.*, 2011). And as concluded by (Harris *et al.*, 2011), "PEA can help move past more normative governance analyses, in assisting funders, practitioners and stakeholders to identify the reasons behind key political and economic constraints and barriers for sector change".

While the governance analysis and assessment tend to be typically associated with the pursuit of "good governance", the PEA is more associated with "good enough governance" thinking ((Grindle, 2007) as cited by (Harris *et al.*, 2011)). Combining both approaches can be problematical. But the recommendation of (Harris *et al.*, 2011) is the use of PEA in research for designing and implementing water supply and sanitation interventions to improve the outcomes of the sector. The PEA of WSS service delivery involves identifying and addressing stakeholder interests and institutional determinants of processes and outcomes of WSS investment (Harris *et al.*, 2011).

(Harris *et al.*, 2011) draw from the literature three distinct sets of body of literature that deals with sector reform; barriers and improved outcomes as indicated below. He concluded that political economy analysis is in its relative infancy.

- Sector governance assessments, found by (Harris *et al.*, 2011) in "(USAID 2009; AfDB 2010; Dayem & Odeh 2008; Hirsch, Carrard, et al. 2006; Robinson 2002)". It is the most developed body of research in which the performance of institutions is appraised against ideal set of characteristics for the "good governance" of WSS services.
- Political economy analysis of the sector, found by (Harris *et al.*, 2011) in "(WSP 2011; Singh 2008; Swatuk 2008; World Bank 2008)". It is an emerging type studies in which the sector context as it exists is taken as the starting point for research, with the aim to better understand the political and economic contexts within the sector. Thereby, these analyses point to uncover underlying structures, institutions, and processes that act as either blockages or drivers to sector reform.
- Sort of combined analysis of governance assessment and political economy analysis, found by (Harris *et al.*, 2011) in "(O'Meally 2010; Foot & Rashid 2009; World Bank 2009)". Dual governance and political economy analytical frameworks have been applied in this body of literature.

In conclusion, governance assessment is useful in prescribing the state of governance of the WSS services but is deficient in determining the underlying processes behind blockages to sector reform. The approach is now applicable at the broader water sector and is central for governance reform especially after the declaration of the "Global Water Partnership" (GWP) that "the world water crisis is mainly a crisis of governance" (GWP, 2000). The application of political economy analysis in WSS sector is still in its relative

infancy. It is initiated to a large extent by a series of World Bank studies. It looks at the political and institutional contexts that influence stakeholders' decisions in the WSS sector. Presenting sector governance challenges as part of a wider narrative of political and economic issues is deemed helpful (Harris *et al.*, 2011).

2.8 Natural Monopoly of WSS Sector

Telecommunication, electricity, gas, water and oil utilities, and railways transport are natural monopolies being centered on networks (Yarrow, 1994 as cited by Ran Kim and Horn, 1999).

The economic literature usually cites urban water and sanitation services among the most relevant examples of "natural monopolies". Water supply, sewerage and stormwater services exhibit engineering economies of scale as well as economies of scope.

(Kahn, 1971) gives the technology-oriented and traditional definition of natural monopoly that "the technology of certain industries or the character of the service is such that the customer can be served at least cost or greatest net benefit only by a single firm".

(Sherer 1980 as cited by Ran Kim and Horn, 1999) has indicated that a natural monopoly exists when "economies of scale are so substantial that a single firm can produce total business output at a lower unit cost, and thus more efficiently than two or more firms". In the same line, (Ran Kim and Horn, 1999) said that natural monopoly situation usually arises when "there are large fixed costs and small marginal costs".

2.9 Regulation of Water Supply and Sanitation Services

In most of the countries, monopoly utilities are in place to run WSS services. This is related to the large economies of scale and the nature of infrastructure network required that make single entity more efficient in operating the services. These utilities are often owned, run and regulated by the government, and their services have been used to be perceived by the public as "public service" or even a "social good" (PPIAF, 2002).

Since the early 1980s, there has been a shift in paradigm from public monopoly to Privatization. The budgetary crisis of the governments, the increasing dissatisfaction with the performance of public utilities, and the ever-increasing needs for investment in utility and other network industries worldwide have caused policymakers to be to a greater extent oriented towards private sector participation (Ran Kim and Horn, 1999).

However, in the past decades, water sector reforms worldwide have turned the focus to the "regulation of the sector". Nonetheless it is not all the time clear "what is meant by regulation" or "which problems regulation is able to solve" (Groom et al., 2006).

In the other markets like food supply, the suppliers either provide "good service" at "efficient cost" or leave the business. This is the effect of competition that customers rely on to make providers accountable to them. But this is not the case with the WSS service providers who have non-existent or limited competition because of the monopolistic nature of WSS services (Halpern *et al.*, 2008).

Economic regulation is required to tackle the problem of "natural monopoly". A core definition of the Economic Regulation is "the rules and organizations that set, monitor, enforce, and change the allowed tariffs and service standards for water providers" (Groom *et al.*, 2006).

In other words, economic regulation can practically be thought of "as mimicking the pressures that competition provides in other markets" (Groom *et al.*, 2006). That is, regulation should make providers offer services that meet the wants of their customers at reasonable tariffs. In this sense, reasonable tariffs are "tariffs that cover the reasonable cost of providing the service, including a reasonable return on capital used, but no more" (Groom *et al.*, 2006).

Trémolet and Hunt (2006) address the concept of "regulation and regulatory frameworks" in the water sector in an interesting way. According to (Trémolet and Hunt, 2006), regulation is defined as "a set of functions that consist of (a) ensuring that water and sanitation service providers comply with existing rules (mainly on tariffs and quality standards) and (b) adapting those rules to cope with unforeseen events", while, a regulatory framework consists of "the set of rules and processes that bind the water and sanitation service providers, including formal rules (laws, contracts, bylaws, etc.) and informal rules (personal commitments, financial incentives, reputation, etc.). It also defines how the main regulatory functions are allocated to various institutions, which can include an autonomous regulatory agency, a ministry, an asset-holding company, a customer group, an independent expert, and so forth".

There is no need to have a regulatory body in order to have regulation or regulatory framework. But, apparently, there is a need that WSS service providers whether public or private be regulated in some way (Trémolet and Hunt, 2006).

Regulations "by agency" or "by contract" are among the institutional models that may be used. Depending on the ownership of the service provider and the market structure of WSS service provision, the regulatory institutional models vary. Special emphasis has been made on the design of regulatory frameworks and, specifically, the establishment of regulatory agencies in the case of private sector participation. Service provision is (1) in most of the cases decentralized to the local level to municipalities or to publicly owned corporatized utility, or (2) in other few cases, delegated to private operators using various types of contracts of the private sector, or (3) in some countries, decentralized to publicly or privately-owned national or regional utilities which serve multiple municipalities at once (Trémolet and Hunt, 2006).

On the other hand, market structures and regulatory models of WSS services are, among others: (1) self-regulation by the board of directors of publicly-owned utility as in the case of state-owned company, ministerial department or municipality, (2) by a monitoring body (with or without formal contract), or (3) "peer-to-peer regulation" particularly in the case of independent private enterprises (Trémolet and Hunt, 2006).

The model of "autonomous agency" may be advantageous in some circumstances, as the regulatory functions may be more clearly assigned and the regulatory competencies can be concentrated in one institution. The model is particularly helpful in taking into account the needs of poor customers. The principles of this note can be applied to either private or public providers, however with highlighting the difficulty of relying on sanctions or incentives to motivate public providers to perform, because of political pressures, internal rigidities, or weak market orientation (Trémolet and Hunt, 2006).

A last word on regulation taken from (Foster, 2005) is that a sort of background consistency must be in place between the institutional nature of the regulated entities and the form of regulation. This is manifested at two different levels. "First, the political and geographical jurisdiction of the regulator must be compatible with that of the service providers. Second, the choice of regulatory instruments must be suitably adapted to the managerial incentives of the water operators".

2.10 Measuring Performance

A series of indicators has been developed by the "International Benchmarking Network for Water and Sanitation Utilities (IBNET)" to help conduct a complete physical check-up of an urban WSS sector or an urban WSS service provider (van den Berg and Danilenko, 2011).

IBNET distinguishes between "metric benchmarking" and "process benchmarking". Metric benchmarking is "measuring performance against various indicators", while process benchmarking is "understanding the legal, policy or institutional factors that lead to apparent performance gaps". Process benchmarking utilizes metric benchmarking as a foundation for bridging performance gaps and for achieving best performance, taking into account local circumstances (van den Berg and Danilenko, 2011).

Locussol *et al.* (2009) emphasize the need to carry out a rigorous diagnosis of the sustainability, reliability and affordability of the WSS Service using indicators such as that developed by the IBNET.

Locussol and Ginneken (2010) complemented the extensive work done on the performance indicators through the IBNET, by proposing a template for "assessing the governance of WSS service providers and its impact on the quality of service and performance of operations".

2.11 The Millennium Development Goals (MDGs) & the Sustainable Development Goals (SDGs)

In recent years, a number of countries have grouped to specify and agree on development goals for reducing poverty and increasing welfare (Mehta, 2003). These were displayed in "the Millennium Development Goals (MDGs)" following the "Millennium Declaration" which was signed by the United Nations Member States in 2000 (UNICEF and WHO, 2015).

Goal 7 of the MDGs, "to ensure environmental sustainability", included a target that challenged the global community "to halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation". The "WHO/UNICEF Joint Monitoring Program for Water Supply and Sanitation (JMP)", which began monitoring the sector in 1990, has tracked changes over 25 years (to 2015) providing regular estimates of progress towards the MDG targets (UNICEF and WHO, 2015). The JMP method is based on water and sanitation 'ladders' which was developed by the JMP to visualize trends in service levels, by differentiating between improved and unimproved facilities, and drew attention to a broad range of issues relevant to policymakers, including inequalities in service provision, gender, open defecation, handwashing and shared sanitation (UNICEF and WHO, 2015). The JMP drinking water and sanitation ladders are shown in Figure 2-1.

The MDG targets for drinking water and sanitation have been developed over time. Their evolution is presented in Table 2-3.

Table 2-3 Evolution of the MDG Targets for Drinking Water and Sanitation (after UNICEF and WHO, 2015)

Targets have been developed as follow:
Millennium Summit (2000): To halve, by the year 2015, the proportion of people who are unable to reach or to afford safe drinking water.
World Summit on Sustainable Development (2002): Halve, by the year 2015, the proportion of people who are unable to reach or to afford safe drinking water and the proportion of people who do not have access to basic sanitation.
United Nations General Assembly (2004): Halve, by the year 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.

The reaching of the 2015 horizon alarmed the ending of the MDGs era. In the same year, the countries adopted the Sustainable Development Agenda to be achieved by 2030 and its "17 Sustainable Development Goals (SDG)".

The SDG on clean water and sanitation, goal six, states that "by 2030, ensure availability and sustainable management of water and sanitation for all", extending the original MDG

7 targets to cover all freshwater issues from the perspective of economic, social and environmental sustainability, in a holistic manner (UN-Water and WHO, 2017). The first two targets of the SDG 6 aim to "achieve universal and equitable access to safe and affordable drinking-water for all" (Target 6.1) and to "achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations" (Target 6.2). The new Targets 6.3-6.6 address issues that include, but go beyond drinking-water supply and sanitation: wastewater management, water use efficiency, integrated water resources management (IWRM) and aquatic ecosystems' protection and restoration. Targets 6.a and 6.b focus on the means of implementation for achieving SDG 6 (UN-Water and WHO, 2017).

	Drinking Water Ladder	Sanitation Ladder	
Unimproved Drinking Water	**Surface drinking water sources:** River, dam, lake, pond, stream, canal, irrigation channels.	**Open defecation:** when human faeces are disposed of in fields, forest, bushes, open bodies of water, beaches or other open spaces or disposed of with solid waste.	Unimproved Sanitation
	Unimproved drinking water sources: Unprotected dug well, unprotected spring, cart with small tank/drum, tanker truck, bottled water.[3]	**Unimproved sanitation facilities:** do not ensure hygienic separation of human excreta from human contact. Unimproved facilities include pit latrines without a slab or platform, hanging latrines and bucket latrines.	
Improved Drinking Water[1]	**Other improved drinking water sources:** Public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs, rainwater collection.	**Shared sanitation facilities:** Sanitation facilities of an otherwise acceptable type shared between two or more households. Only facilities that are not shared or not public are considered improved.	

	Piped water on premises: Piped household water connection located inside the user's dwelling, plot or yard.	**Improved sanitation facilities:** are likely to ensure hygienic separation of human excreta from human contact. They include the following facilities:
		- Flush/pour flush to:
		  - piped sewer system septic tank
		  - pit latrine
		- Ventilated improved pit (VIP) latrine
		- Pit latrine with slab
		- Composing toilet
			Improved Sanitation[2]

[1] An improved drinking water source is one that, by the nature of its construction, adequately protects the source from outside contamination, particularly faecal matter.
[2] An improved sanitation facility is one that hygienically separates human excreta from human contact. Sanitation facilities shared with other households are not considered to be improved.
[3] Bottled water is considered 'improved' for drinking only when the household uses an improved source for cooking and personal hygiene.

Figure 2-1 The JMP Drinking Water and Sanitation Ladders (after UNICEF and WHO, 2015)

2.12 Non-Revenue Water (NRW)

The difference between the volume input to a water distribution system and the volume of water billed to consumers is called "Non-Revenue Water" (NRW) (Kingdom *et al.*, 2006). The level of NRW is a key performance indicator of efficiency to most water utilities (Farley *et al.*, 2008), where high NRW levels indicate poor management, in the form of either poor infrastructure maintenance or poor commercial practices (van den Berg and Danilenko, 2011). Despite of the shortcoming of the use of percentage figures to compare levels of NRW, its use remains common (van den Berg and Danilenko, 2011).

The International Water Association (IWA) has developed a standard international water balance structure and terminology with definitions of all terms involved. It has been widely adopted by national organizations in many countries across the world (Farley *et al.*, 2010). The terminology and the components as it was first published in 2000 are presented in Figure 2-2.

<table>
<tr><td rowspan="8">System Input Volume</td><td rowspan="3">Authorized Consumption</td><td rowspan="2">Billed Authorized Consumption</td><td>Billed Metered Consumption (including water exported)</td><td rowspan="2">Revenue Water</td></tr>
<tr><td>Billed Unmetered Consumption</td></tr>
<tr><td rowspan="2">Unbilled Authorized Consumption</td><td>Unbilled Metered Consumption</td><td rowspan="6">Non-Revenue Water</td></tr>
<tr><td>Unbilled Unmetered Consumption</td></tr>
<tr><td rowspan="5">Water Losses</td><td rowspan="2">Apparent Losses</td><td>Unauthorized Consumption</td></tr>
<tr><td>Customer Meter Inaccuracies and Data Handling Errors</td></tr>
<tr><td rowspan="3">Real Losses</td><td>Leakage on Transmission and Distribution Mains</td></tr>
<tr><td>Leakage and Overflows at Utility's Storage Tanks</td></tr>
<tr><td>Leakage on Service Connections up to the Customer Meter</td></tr>
</table>

Figure 2-2 IWA Standard Water Balance Showing NRW Components (after IWA, 2000)

According to the (IWA, 2000), water losses can be computed as the difference between System Input Volume and Authorized Consumption and consist of Real Losses and Apparent Losses. Real Losses, sometimes referred to as "Commercial losses", are the volume lost through all types of leaks, bursts and overflows on mains, service reservoirs and connections, up to the point of customer metering, while Apparent Losses, sometimes referred to as "Physical Losses", consist of Unauthorized Consumption and all types of metering inaccuracies (Farley *et al.*, 2008; Fantozzi *et al.*, 2009). And so, the NRW comprises three components: real losses, apparent losses, and unbilled authorized consumption (Kingdom *et al.*, 2006). In any water supply system, a certain level of real losses will remain. This amount is known as Unavoidable Annual Real Losses (UARL).

But it can be reduced to an economic level. The difference between the Current Annual Real Losses (CARL) and the economic level of real losses is the potentially recoverable real losses. Likewise, apparent losses can be reduced to a certain minimum level, which is the Unavoidable Annual Apparent Losses (UAAL).

Previously, the expression used for the difference between water produced and water consumed was referred to as 'Unaccounted for Water' (UFW). However, the IWA Task Forces have recommended that use of the term 'Unaccounted for Water' (UFW) be discontinued (Alegre *et al.*, 2000), because of widely varying interpretations of the term worldwide. Now, the use of the term UFW has been reduced internationally and is substituted by the NRW and the IWA standard definitions and methodology.

2.13 Theoretical Framework

This section provides an overview of what is already known about the topic of "Utility Reform". It presents the set of the theories, ideas and topics which have been used by others to analyze this subject. As well, it summarizes the key issues covered while presenting them in a logical framework that shows how they link to each other.

2.13.1 Rationale for Reform

There are in essence two general drives for utility reforms as explained by (Foster, 2005):

2.13.1.1 Macroeconomic

From the perspective of macro-economy, utilities reform can be regarded principally as an instrument for the improvement of public finances. Utilities often make part of the most valuable state-owned assets. Nonetheless, being run within the public sector has fiscally burdened the governments because of the potential large capital and operational subsidization made. For this, different forms of the sector reform including privatization are thought to be the remedy to face fiscal crisis. On the other hand, macroeconomic concerns about "inflation", as the case in some countries, can bar the attainment of financially sustainable tariffs (Foster, 2005).

2.13.1.2 Microeconomic

From the perspective of micro-economy, reform can be regarded as an instrument for the improvement of the sector performance, particularly by strengthening incentives for efficiency, enhancing accountability for the quality of the service, and augmenting financing availability for the expansion of the service. In these cases, reforms are designed to address performance gaps historically found in public utilities, with a stress on restructuring of the sector, regulation, and institutional change (Foster, 2005).

2.13.2 The New Public Management (NPM) Theory

Although there is non-existent standard model for water utility management that ensures good performance, well-performing utilities appear to have shared attributes that relate to

the internal functioning of the utility, as well as to the environment in which the utility operates. The World Bank research explains the factors why certain public utilities are doing better than others. Its theoretical framework stems from the "New Public Management (NPM) theory" of (Horn, 1995).

The New Public Management (NPM) theory is the heart theory to steer the process of reform because of a combination of worthwhile NPM principles for reform and the possibility to translate these principles into effective instruments. The NPM also uses contracts for formalizing the relation between the utility or the service provider and its environment. The operational instruments which have been derived from the general principles of the NPM can eventually lead to a number of different reform actions to be undertaken in a certain combination (the reform package) and optimal sequence to provide the best fit reform plan in a given situation.

Halpern *et al.* (2008) presented the essence of the New Public Management approach as presented in Table 2-4.

Table 2-4 New Public Management Approach (adapted by the researcher (after Halpern *et al.*, 2008)

"New Public Management" to Improve the performance of water utilities
The "New Public Management" (NPM) approach may be used to offer ways to improve the performance of water utilities. NPM is a reaction against traditional public-sector bureaucracy. NPM advocates that a public sector organization should • Be autonomous in managing their inputs and processes, with this autonomy matched by accountability for results to external organizations and the owner • Have a strong market-orientation—that is, purchases services from private competitive suppliers, and outsource functions that are not core to the business (for example, security, transport, maintenance, and so on) • Have a strong customer-orientation—that is, reinforce the culture of aligning its services with customers' needs. • Be decentralized. • Give employees autonomy while holding them accountable for results. While these approaches may work for some organizations, it is also true that the benefit of these approaches has not been empirically demonstrated in developing countries. It may be that NPM works better in high capacity countries with skilled staff who are used to self-managing, and which have traditions of contracting and accountability.

Source as cited by (Halpern et al., 2008): Schwartz, K. (2006). "Managing Public Water Utilities: An Assessment of Bureaucratic and New Public Management Models in the Water Supply and Sanitation Sectors in Low- and Middle-Income Countries". UNESCO-IHE Institute for Water Education.

2.13.3 Approaches for Utility Reform

In the past decades, the major transformation of most utilities has not been from public to private service provision, but from centralized to decentralized public provision (Ginneken and Kingdom, 2008). Under fiscal drain, new management tools, often

borrowed from the private sector, have been adopted by many public institutions to complement more traditional bureaucratic tools.

2.13.4 Attributes of Well-Performing Public Water Utilities

There is no perfect model for public utilities that ensures good performance. But well-performing utilities have common attributes (Ginneken and Kingdom, 2008).

Baietti *et al.* (2006) introduces an array of common attributes of well-run water utilities as a foundation for developing reform options aimed at improving performance:

- **Autonomy** – "being independent to manage professionally without arbitrary interference by others".
- **Accountability** – "being answerable to other parties for policy decisions, for the use of resources, and for performance".
- **Consumer Orientation** – "Reporting and (listening) to clients, and working to better meet their needs".

These attributes are applicable to the "relationship between the utility and the environment in which it operates" as well as to the "internal functioning of the utility" (Ginneken and Kingdom, 2008).

2.13.4.1 Autonomy and Accountability of the Utility and its Environment

The manner in which a utility operates is inherently linked to the environment within which it runs. The relation between the utility and its environment is characterized by the utility's "accountability to", and "autonomy from", entities that exercise direct influence or power on the utility (Ginneken and Kingdom, 2008).

Well-performing utilities have a significant degree of autonomy combined with an accountability framework that balances various external forces. Conversely, poorly functioning utilities usually have a low autonomy. Figure 2-3 displays a number of factors that influence the "effective autonomy" of a utility.

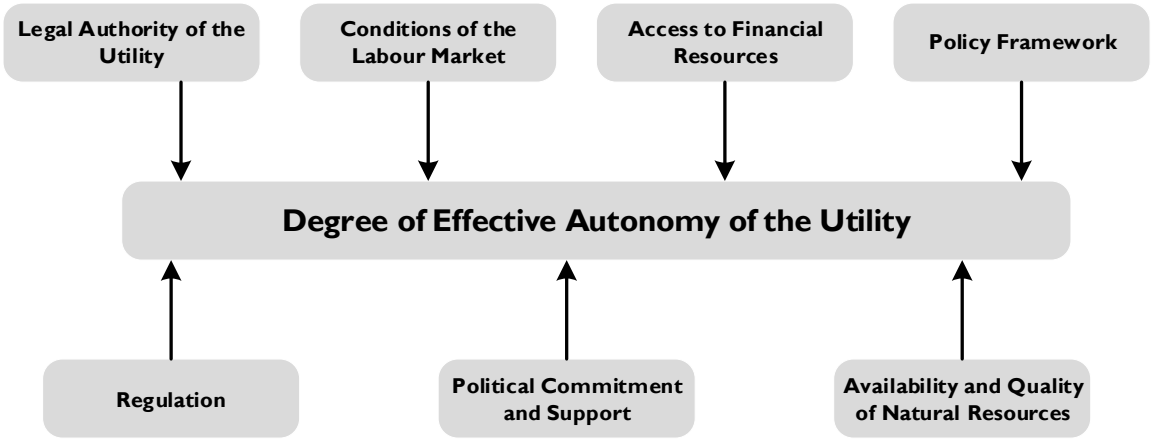

Figure 2-3 Factors that Influence Effective Autonomy (adapted by the researcher from van Ginneken and Kingdom, 2008)

The functions each actor fulfils vis-à-vis the utility determines the nature of accountability to that actor. Habitually actors combine various functions (Ginneken and Kingdom, 2008). Table 2-5 summarizes the main functions of the actors.

Table 2-5 Main Functions of Utility Stakeholders (after van Ginneken and Kingdom, 2008)

Main Functions of Actors Around the Utility
• Policy-making – setting principles that guide the management of a given organization. This function normally lies with various tiers of government. • Ownership – owning the utility. In the case of public utilities, this function lies with one or more government agencies. • Regulation – setting, monitoring, enforcing and changing the allowed tariffs and service standards for utilities (Groom, 2006). This function can lie with the government agency that owns the utility or with another government agency. • Financing – providing financial resources both in debt and equity. This function is normally shared by consumers and governments and sometimes with private investors and donor agencies. • Demand for Service – This function lies with the consumers of the utility.

2.13.4.2 Autonomy and Accountability within the Utility

Well-performing utilities have turned from the "traditional hierarchical setup" towards "flatter decision-making structures" in which management and employees are held accountable. Process and performance data should be clear to managers and employees in order to be held to account. To improve accountability in a utility, the following measures can be applied: standard processes and streamlined procedures, business plans, cost accounting techniques "that link resource use to outputs", rewards and penalties for employees, training of staff targeted to improve their skills and performance, and

decentralization of responsibilities to lower tiers of management (this depends on the size of the utility) (Ginneken and Kingdom, 2008).

"Benchmarking the performance of water utility over time and between companies" can be a powerful tool for management to improve performance by comparing how well their organization does in comparison with similar organizations, and can also help external stakeholders to hold the utility accountable for results. Besides, introducing quasi-competition mechanisms such as outsourcing, fee charging between departments, and internal contracting can stimulate the utility staff to deliver results in an effective way (Ginneken and Kingdom, 2008).

2.13.4.3 Consumer Orientation

Consumer orientation is "the degree to which utilities report and listen to their consumers and work to better meet their needs". Consumer orientation increases the accountability of the service provider to its consumers and thus helps "depoliticize" the provision of services. It aligns utility operations with consumer needs and demands and stimulates innovation, as the utility seeks improvements to increase the satisfaction of the consumers as efficiently as possible (Ginneken and Kingdom, 2008).

2.13.5 Key Topics in Public Water Utility Reform

The tools to achieve these attributes of well-performing utilities vary, however certain patterns of high potential practices are emerging. (Ginneken and Kingdom, 2008) addressed "institutional measures" to turn public utilities more effective. These institutional measures include "corporatization", "public-public performance agreements", "consumer accountability tools", and "capacity building".

2.13.5.1 Corporatization

Corporatization is a mean to balance external accountabilities. Corporatization is "the process of transforming a department that is embedded within a municipality or ministry into a public organization with its own corporate identity: either a statutory body functioning under public law or a government owned company incorporated under company law". the ownership remains public in both cases where the oversight board acts as a buffer between the utility management and the owners. The composition and the mandate of the board of directors, the ownership of assets, and the discretion of utility management in key operational areas are key factors in the success of the design and implementation of corporatization (Ginneken and Kingdom, 2008).

2.13.5.2 Public-public performance Agreements

Performance agreements can make clear "the objectives of a public utility" and provide "a relative weight for the stated objective between the government and the utility, its corporate oversight board, and its managing director". Thus, these agreements can help hold managers and boards accountable for performance. Public-public performance agreements range from "informal short term plans (such as business plans)" to "more formal and longer-term agreements that specify sanctions for performance (such as

contract plans)". Contractual agreements between the agencies responsible for the different roles should be used. Ideally, this offers simultaneously the opportunity to set performance and quality standards and it strengthens both policy makers and managers by clearly distinguishing between the determination of the services and their delivery (Ginneken and Kingdom, 2008).

2.13.5.3 Consumer Accountability

Giving consumers the right to hold utilities accountable "can help balance the accountability framework of utilities" and "can help prevent political capture". For consumers to effectively participate in the WSS sector, they need not only a mechanism to participate but also the knowledge and skills to use that mechanism effectively. Complaint mechanisms, survey instruments, board membership, and advisory groups are examples for consumer accountability mechanisms (Ginneken and Kingdom, 2008).

2.13.5.4 Capacity Building

Capacity building "can provide individuals and institutions with the right knowledge and skills to translate decisions into effective management actions". Capacity building programs are more successful and are more likely to be sustainable when they respond to demands expressed by those to be trained (Ginneken and Kingdom, 2008).

2.13.6 Key issues to be addressed for successful design and implementation of Reforms

For (Locussol *et al.*, 2009), assessing the performance of a WSS sector requires a good understanding of:

- The overall accountability framework within which its key actors operate. In their report, the accountability framework is defined as the set of: (i) mandates of the various actors; (ii) contractual arrangements that define relations between actors, and (iii) instruments used by actors to implement their mandates;
- The conditions under which the following key functions are performed: (i) formulation of WSS policies; (ii) management of assets and development of infrastructure; (iii) provision of service; (iv) financing of the development of the infrastructure; and (v) regulation of the service; and
- The governance of WSS service providers.

Nine key issues are considered by (Locussol *et al.*, 2009) to build a sustainable and effective effort at WSS reform: (1) involving stakeholders, (2) revisiting sector policies, (3) Optimizing infrastructure development, (4) Changing the culture of public WSS service providers, (5) Outsourcing of non-core functions, (6) Improving the operations efficiency and the WSS service quality through public-private partnerships, (7) Regulating the service, (8) Financing WSS operations in an affordable and sustainable manner, and (9) Prioritizing issues to be addressed when it comes to implementing reforms.

2.13.7 Stages in the Reform Process

Reforms at the utility level concerning their time horizon:

- The short term crash program
- The medium-term reform package
- In the long term: the institutionalization of reform

The role of donors can be very positive in putting together these short-term packages. If such actions can be undertaken within a broad water sector reform framework, they may be much more effective.

2.14 Review of Public Water Utility Cases

Baietti *et al.* (2006) presented findings on attributes of well-run public utilities with the attempt to identify important factors that influence their performance. The sample of utilities is largely oriented to utilities that serve urban communities with varying characteristics and service objectives. Mainly, the study carried out an extensive review of 11 public water utilities in different country settings as summarized in Table 2-6.

Table 2-6 The Utilities sampled by (Baietti *et al.*, 2006) as a Good Informative Case Studies (after Baietti *et al.*, 2006)

Case Study, Country	*Unique Feature of the Case Study*
AQUA S.A., Bielsko-Biala Poland	Joint stock company partly owned by private investors-operators.
Haiphong Provincial Water Supply Company (HPWSC), Vietnam	Turnaround utility, which adopted the *phuong* model (focusing on improvements in one ward at a time).
Johannesburg (JNB) Water, South Africa	Public utility using extensive public-private partnerships in which the municipal owner has gone to great lengths to clearly separate out all the roles and responsibilities within the utility and the external environment.
National Water and Sewerage Corporation (NWSC), Uganda	Turnaround utility with impressive performance improvements, using performance contracts extensively and adopting a wide range of change management tools to improve performance.
ONEA, Burkina Faso	Utility with a good track record over the past decades despite being in one of the poorest countries in the world.
Public Utilities Board (PUB), Singapore	Superior performing utility extensively involving the private sector by way of service contracts.
Philadelphia Water Department (PWD), Philadelphia, United States	Ring-fenced department of the Philadelphia city government.
SANASA, Campinas, Brazil	Turnaround utility, which strongly mimics the functioning of private sector companies but is owned by the municipality of Campinas.
SIMAPAG	One of five utilities operating in the same institutional environment in Mexico.
Scottish Water, Scotland	Utility accountable to the Scottish Parliament and subject to an external, independent economic regulator.
SONEDE, Tunisia	National utility that mainstreams a two-pronged approach by delegating responsibilities to line managers and extensive contracting out to the private sector.

General comparison of the case studies is summarized in Table 2-7, and the findings are presented under common framework based on the concept of the New Public Management (NPM) as shown in Table 2-8.

Table 2-7 Summary Comparison of Case Studies (after Baietti *et al.*, 2006)

Case Study, Country	*Institutional Model*	*Decentralization Level*	*Country Income Level*	*Per Capita Income, UD$/year*	*Tariff US$/m^3, (% per capita income/month)*	*Working Ratio*	*Non-Revenue Water (NRW)*
AQUA, Poland	Mixed company	Regional	Middle income	4,570	1.00 (0.26%)	36%	42%
HPWSC, Vietnam	Statutory body	Municipal	Lower income	430	0.18 (0.50%)	62%	32%
JNB Water, South Africa	Government- owned company	Municipal	Middle income	2,500	0.68 (0.33%)	53%	35%
NWSC, Uganda	Statutory body	National	Lower Income	240	0.40 (2.00%)	79%	39%
ONEA, Burkina Faso	Government- owned company	National	Lower Income	250	0.69 (3.31%)	66%	17%
PUB, Singapore	Statutory body	National	High Income	20,690	0.68 (0.04%)	58%	5%
PWD, USA	Ring-fenced department	Municipal	High Income	35,400	1.88 (0.06%)	67%	32%
SANASA, Brazil	Mixed company[a]	Municipal	Middle income	2,830	0.26 (0.11%)	79%	26%
Scottish Water, UK	Government-owned company	National	High income	25,510	1.79 (0.08%)	52%	42%
SIMAPAG, Mexico	Statutory body	Municipal	Middle income	5,920	0.35 (0.07%)	77%	18%
SONEDE, Tunisia	Statutory body	National	Middle income	1,990	0.41 (0.25%)	98%	20%

a) SANASA is actually owned by the Campinas municipal government, which has 99.9 percent of its shares.

Table 2-8 The Findings of (Baietti *et al.*, 2006) from Individual Case Studies (after Baietti *et al.*, 2006)

Attribute	*Findings*
Institutional Environment in which the Utility Operates-	
External Autonomy	• Although utilities do not have complete authority to set their tariffs, they are able to put forward proposals that are consistent with their overall revenue requirements. • Public procurement rules, though considered to be intrusive, were followed without a significant impact on performance. • Although most utility managers do not have total control of setting staff salary scales, they are able to hire and retain qualified staff. • Most public utilities rely on government to source investment financing. • Board members are generally appointed by the government to represent the interests of owners.
External Accountability	• All utilities are subject to well-defined performance targets. • Performance contracts are useful tools for sharing information but have limitations for enforcing performance. • The use of external auditors to enhance fiduciary responsibilities is almost universal. • Most public utilities require authorization to secure external financing. • External groups can be represented in utilities advisory or management oversight bodies. • Independent regulatory arrangements are the exception rather than the norm because most utilities are regulated by their owners.
Internal Functioning of the Utility	
Internal Accountability for Results	• Senior management systematically reports to their boards on performance. • Incentive-based systems for top management are common. • Staff members are also subject to rewards and penalties to achieve well-defined performance targets. • Most public utilities have focused on training for improving staff skills.
Market Orientation	• Utilities outsource mostly non-core functions and retain core ones. • Although benchmarking exercises are becoming common, there are no clear-cut paradigms for using data collected for improving performance. • Most public utilities are not involved in market testing.
Customer Orientation	• Public water utilities have developed billing and collection systems that best overcome specific constraints faced by various groups of customers. • Public utilities actively survey their customers to learn their opinions/ views. • Customers have the opportunity to express their preferences regarding service options. • Customers are informed about service changes or interruptions. • Utilities have developed effective complaint mechanisms.
Corporate Culture	• Well-defined mission statements provide an internal indicator of good corporate culture. • Performance is the basis for salary increases in most utilities. • Utilities provide ample career opportunities to their staff and experience low turnover. • Water utilities have training programs for their staff as part of their annual performance agreements. • Staff members are informed of management decisions on a need to know basis.

2.15 Political Challenges in Providing WSS and Reform

WSS services have a number of characteristics that make the reform process intrinsically political (Baietti *et al.*, 2006), for social, economic and governance reasons. This synthesis builds the foundation required for the reform process when it is captured in a governance and political economy analysis as an important first step in designing successful utility reform. This corner will present in a series of short notes issues related to the politics around the water and sanitation services highlighting the importance of the water supply and sanitation services with focus on the many political considerations that makes sector reform difficult.

2.15.1 Water and Sanitation Service is Politically Salient for Social Reasons

Water and sanitation has many social dimensions and is often seen as a basic human right that shall be extended to all people, because providing appropriate basic water and sanitation (WSS) services is important for societal health and productivity and is an absolute necessity in human survival (World Bank, 2015).

The need for a safe and convenient water supply is self-evident especially to the poor (WHO and UNICEF, 2000), as improved or deficient WSS services affects primarily them.

Transmission of diseases such as diarrhoea, cholera, hepatitis A, dysentery, polio and typhoid are linked to contaminated water and poor sanitation thereby exposing individuals to preventable health risks (WHO, 2016). About 842,000 people die every year from diarrhoea as a result of unsafe drinking water, sanitation and hand hygiene (WHO, 2012; WHO, 2016). Women and children are the most who suffer burdened by the everyday work of carrying water containers long distances. They must also endure the sickness, shame, and indignity because of lack of hygienic sanitation (DFID, 2017).

In peri-urban and rural areas of developing countries, unserved people pay very high prices to water vendors for meagre water supplies (DFID, 2017) often of low quality, or make their own inadequate arrangements. In other cases, unserved consumers in informal settlements try to gain the service at any cost and through any means, for example through informal service providers and illegal connections (PPIAF, 2002) or through leaking pipes. Thereby, their productivity lessened and their poverty is aggravated, while their sickness puts severe strains on hospitals and health services (DFID, 2017). All of that will increasingly take a toll on the economies of the countries in which they are located (PPIAF, 2002). (WHO, 2012) indicated that loss of productivity due to diseases related to water and sanitation costs many countries up to 5% of GDP.

As a result, poor WSS have a high health toll, whereas improved water supply and sanitation significantly contributes to better health, poverty reduction and economic growth (WHO, 2016). The interaction between economic growth and improved WSS is mutually reinforcing and has the potential to start a “virtuous cycle” that ameliorates the poor’s lives (SIWI, 2005).

Compared to the investment costs, the economic benefits of improved water supply and – in particular – sanitation are enormous (SIWI, 2005). For every USD 1 invested, the economic returns range from USD 3 to USD 34 depending on region and technology choice (SIWI, 2005).

The economic benefits are immediate and long-term. Immediate benefits include time savings resulted from having WSS facilities closer to home, and avoided health-related costs. Ultimately, this translates into higher school attendance and higher productivity (SIWI, 2005). Besides these benefits which are quantifiable and easily identifiable (time saved, costs avoided), there are other difficult to measure intangible benefits: well-being, convenience, education, etc. (SIWI, 2005).

Considering the importance of having access to safe and convenient WSS services, in 2010, the UN General Assembly and the Human Rights Council recognized the human right to safe drinking water as part of binding international law. And in 2015, the UN General Assembly explicitly recognized the human right to sanitation as a distinct right (UN, 2016). That has been also encapsulated in the Millennium Development Goals (MDG) as clear targets for year 2015 which has been recently upgraded to the Sustainable Development Goals (SDG).

Despite the progress made towards the achievement of the 2015 MDG, the (UNICEF/WHO-JMP, 2015) reported that inequalities in access to drinking water and sanitation remain existing between poor and rich, rural and urban areas, and the general population and the other groups –on above the global geographic inequality (WHO, 2016).

The existence of large number of unserved poor population is regarded by (PPIAF, 2002) as a potential large market for utilities with challenge to innovate on more suitable service delivery arrangements other than the conventional private connection, or the low-cost alternatives of communal stand-posts and public bathing blocks. It is of note that the service to the poor is challenging because: (1) utilities with financial difficulties find it difficult to extend service to new areas, particularly the challenging areas of the urban poor, (2) the poor expressed their desire to be official customers of the water utility as the case in many cities (PPIAF, 2002), but they demand appropriate and affordable services in terms of both the price of the service (consumption charges) and the costs of access (the upfront connection fees), and (3) subsidies can play a role and is often used to enable low-income households to gain house connections however it poses a financial burden on the Government. Civil society groups and NGOs make part of this discussion. They have used to map out services in both urban and rural areas with the aim to push governments towards providing better services expressed in terms of service quality and access levels. They also have been playing active role in enabling the voices of the unserved people and the poor or even providing the WSS services directly to the poor.

From the above discussion, it should be clear that the concerns about these socially sensitive areas lead to political pressure for tariff to be decreased, water quality to be improved, and access to be extended to all communities.

2.15.2 Water and Sanitation is Politically Salient for Economic Reasons

The water industry is not only one of the largest sectors, but also one of the most capital intensive with natural monopolies that needs to be regulated.

Policy making, ownership, fiscal incentives and regulation are tools used by the Government to limit monopoly power and achieve social, safety, environmental and consumer protection objectives (Groom *et al*, 2006). Figure 2-4 displays the overlaps between economic regulation and the other areas of regulation. The core "the area without overlap" is a narrow definition of economic regulation (Groom *et al*, 2006). It is simply "setting, monitoring, and enforcing rules on service quality and tariffs" (Groom *et al*, 2006).

It is believed that economic regulation is best to provide legal controls on service providers to overcome the problem that "water is an essential, monopoly service" (Groom *et al*, 2006), however, well-designed regulatory regimes generally depend on the regulatory and sector structures. For example, combining regulatory oversight with the other functions also leads to issues of misalignment of objectives and severe conflict of interest (Baietti *et al.*, 2006). In principle, regulation compels service providers to "keep costs down, charge fair prices, and provide good service" (Ehrhardt *et al.*, 2008). Nonetheless, in developing countries context, the challenge is often to increase average prices that are "too low" and distorted because of political influences, rather than to restrain a monopolist from pushing tariffs up above the cost of services (Groom *et al*, 2006).

From politics point of view, there are two aspects related to the tariff; cost recovery problems of the service and the finance perspective to this. (Baietti *et al.*, 2006) states that "increases in customer tariffs to cost recovery levels would place added accountability with politicians to improve services as well as for them to come up the additional funding that would be required". Thus, confronted with a policy trade-off, local politicians appease citizens with promises of holding down tariffs (to keep customer expectations low about service improvements) and ultimately block the road to reform (Baietti *et al.*, 2006). Politicians' rational preference of short-term political concerns and solutions over economically sound and sustainable solutions will also affect the financial viability of service providers.

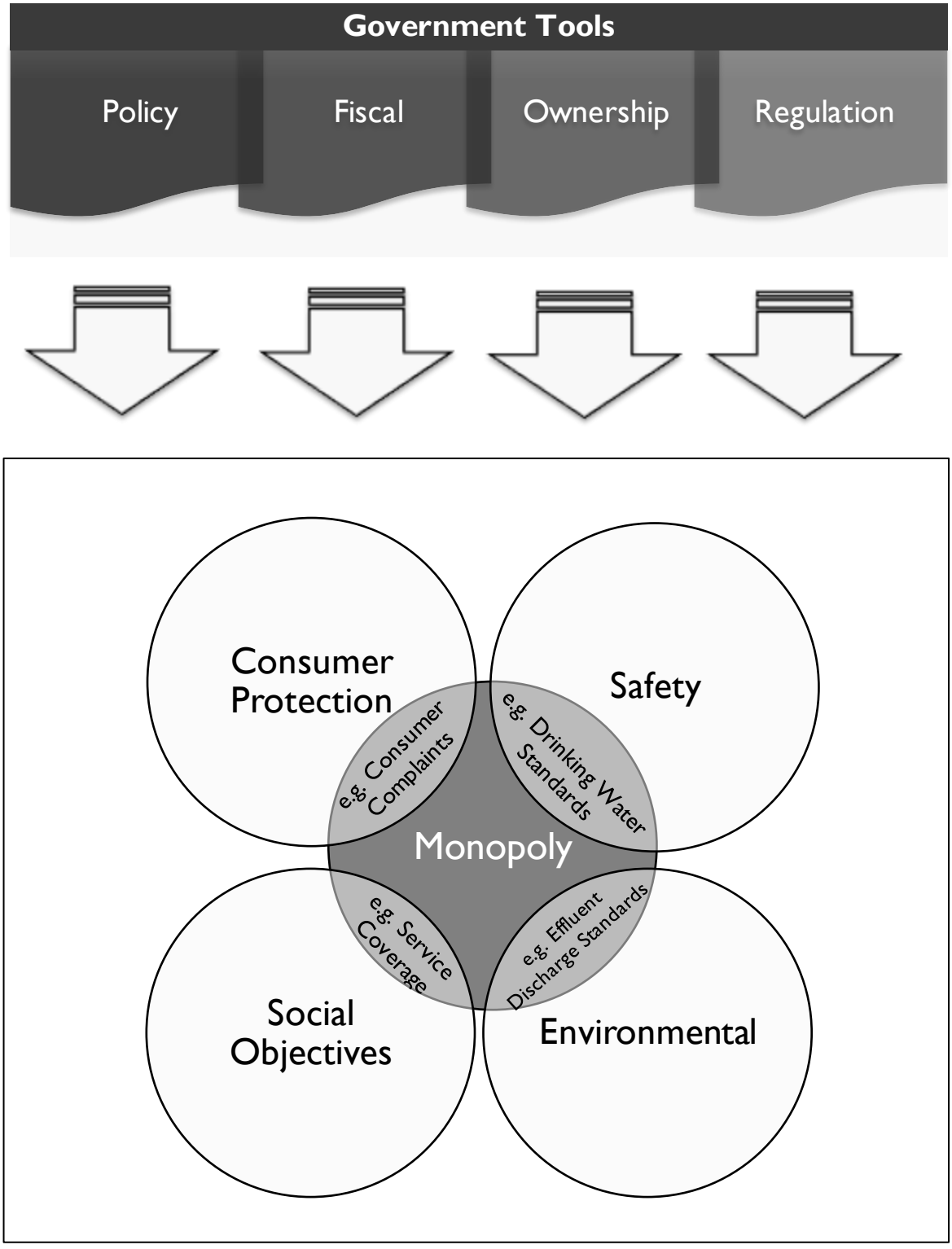

Figure 2-4 Government Functions versus Defining Water Sector Economic Regulation (adapted by the researcher from Groom *et al.*, 2006)

A tariff that reflects the costs is important for the financial viability of the service provider for ensuring the provision of safe and reliable WSS services. Charging below cost is intended to be on the side of the consumers, however this generally has a bad implication. When tariff-s are below cost, the service provider will either cut back on service, investment and maintenance, or become dependent on government subsidies which are rarely sufficient to enable the service provider to function at the level that customers want (Groom *et al.*, 2006). In reality, using subsidies to cover recurring O&M costs are financially troublesome because any sudden cutback in financial support would have serious financial consequences for the utility, its technical performance, and its maintenance programs (Baietti *et al.*, 2006).

Unlike power and electricity distribution, water utilities can be gradually starved of resources without inducing a total shut down of service. WSS services can deteriorate over a long time horizon before a total collapse would happen. In fact, many poorly functioning WSS service providers are habitually relegated to a minimal standard of "life support," where the organization is just barely recovering its operating costs and doing only essential maintenance. Therefore, the quality of the service can drop significantly and the utility still function, albeit poorly (Baietti *et al.*, 2006).

That is, regulation should make providers offer services their customers want at "reasonable tariffs". In this sense, reasonable tariffs are "tariffs that cover the reasonable cost of providing the service, including a reasonable return on capital used, but no more" (Groom *et al.*, 2006) as shown in Figure 2-5. Often, the utility's actual costs are higher than the efficient cost of service.

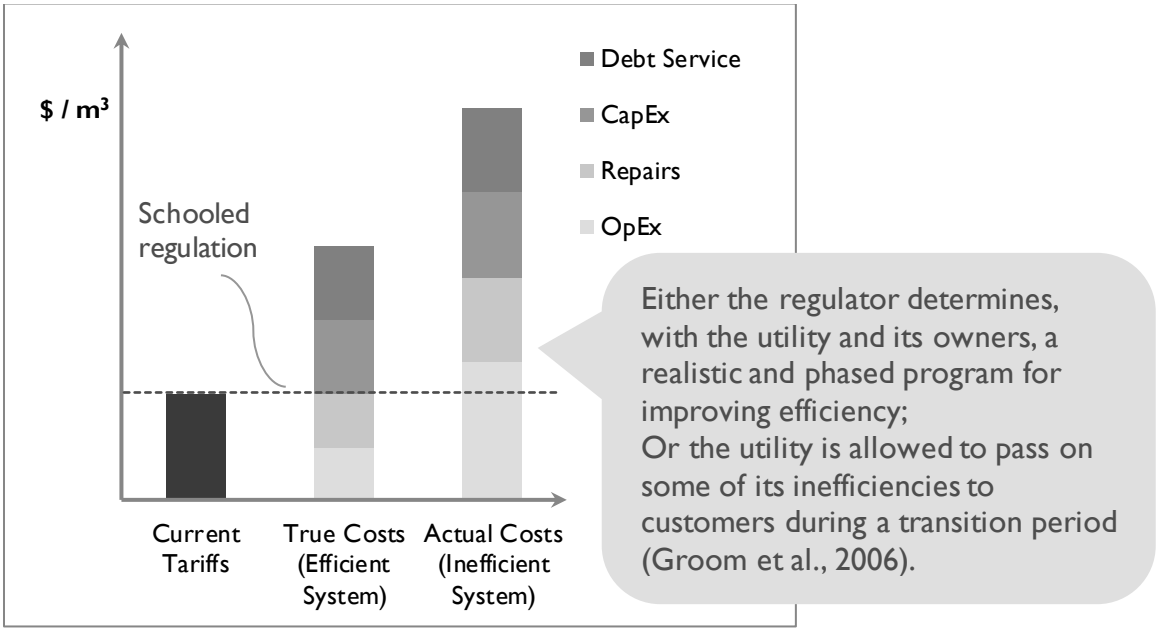

Figure 2-5 Tariff versus Costs Recovery (adapted by the researcher from World Bank, 2015)

In summary, concerns about these regulating areas create political pressures to push tariffs down often below cost-recovery levels, and to impose potentially cumbersome requirements on utilities that distort the balance between financial viability and social acceptability. Moreover, some regulatory structures can also increase risks of adverse political intervention when the three functions of regulation, ownership and policy are not distinct or conflated in the relationship between the government and the utility management.

2.15.3 Water and Sanitation Service is Politically Salient for Governance Reasons

At last, the fact that water and sanitation is socially important service with monopolistic characteristics is at the heart of governance problems in the sector. For this reason, citizens turn to government to make service providers do what citizens want (Halpern *et al.*, 2008).

Figure 2-6 illustrates a generic governance system of the WSS sector. This models governance as "a cycle of accountability (Halpern *et al.*, 2008), in which:

- **Citizens** (including consumers) demand good water services via their central and local governments.
- **Local and central governments** try to make sure that all citizens receive services, and that water service providers—whether public or private—deliver a good service and are responsive to consumers.
- **Providers** deliver services to consumers, who judge that service against their initial expectations and demands."

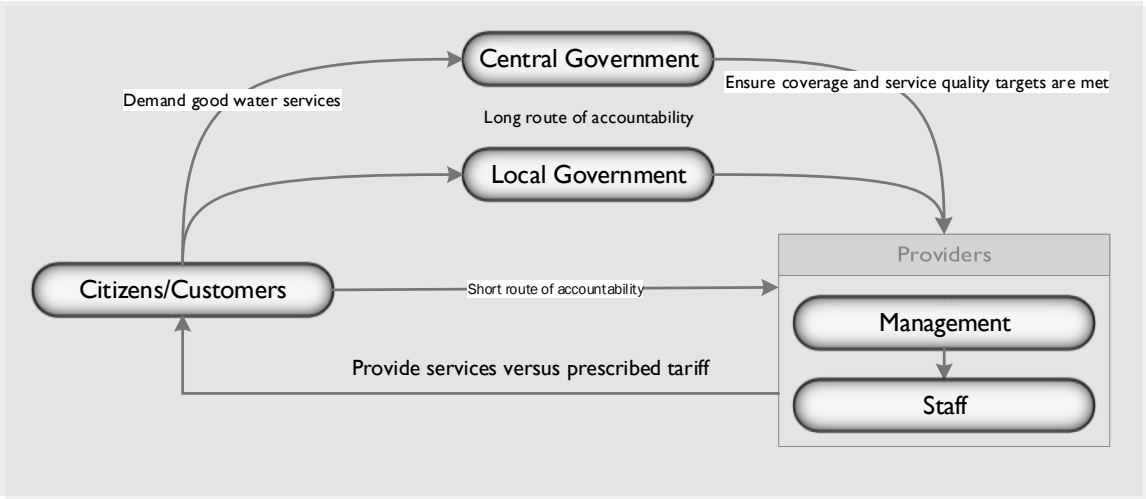

Figure 2-6 The Governance System: a Cycle of Accountability (adapted by the researcher from Halpern *et al.*, 2008)

The fact that in most cases water utilities has been owned and run by the government, the made the public used to this and perceive services of these utilities as a "public service" or even a "social good" (PPIAF, 2002).

Nonetheless, in practice, governments have difficulty in getting their water providers to serve the public interest "to get the provider to deliver a good service at reasonable price". Many national and municipal governments try to make state-owned water organizations serve the public purpose though "governance mechanisms", including appointing the board of directors or management and giving the organization directions or instructions. But governance arrangements often fail because the government cannot sufficiently motivate or monitor management to act in the public interest (Groom *et al*, 2006) and often based on short term pressures from powerful political actors. This is sometimes valid even when governments have outsourced WSS services to private companies, with the intention to increase accountability or competence or both (Halpern *et al.*, 2008).

Overall, the expectations of the public can create political pressures against the management of water as a commodity of economic value, and against sound business management practices. They can also create political pressures in favor of short-term remedies to system- inadequacies.

Figure 2-7 presents a summary of the political economy of the reform of public utilities. It provides a look at the wider context which can present concerns and blockades to reform elements (that might be) taken up, and explains where political support of reforms may be in a shortfall.

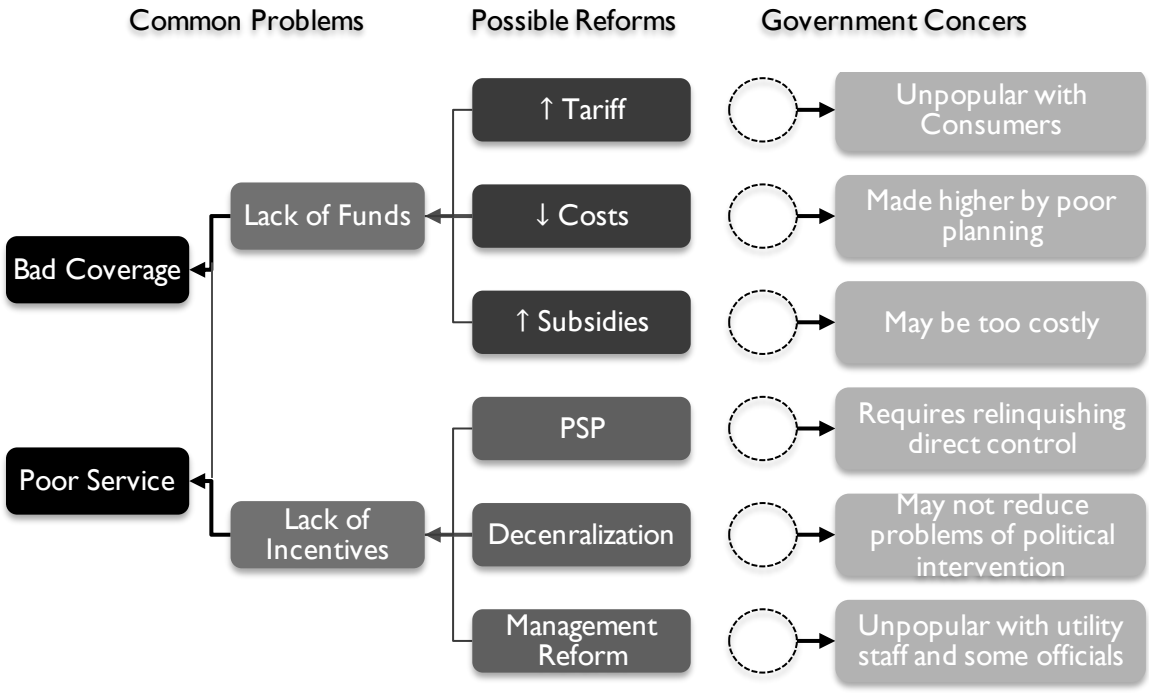

Figure 2-7 Political Economy Context of the Reform (adapted by the researcher from World Bank, 2015)

2.15.4 The Vicious Cycle of Deteriorated Performance

Water and sanitation service, like any service, cannot be sustainable in the long term if its costs cannot be recovered. Tariff below costs will condemn utilities to "a vicious cycle" of underinvestment, losses, and deterioration in both service and efficiency, and to the extent that recurring costs are subsidized directly by the government, the service delivery and planning will be hostage to political whim and short-term political interests. The damage this does outweighs any benefits from the low tariff, and is often worse for customers. However, postponing the problem may be acceptable for politicians, but debt has its own way of spiraling out of control.

Figure 2-8 explains when the utility is bleeding cash without undertaking reform how it will be spiraling into deteriorating service and diminishing efficiency and the consumers end up worse off.

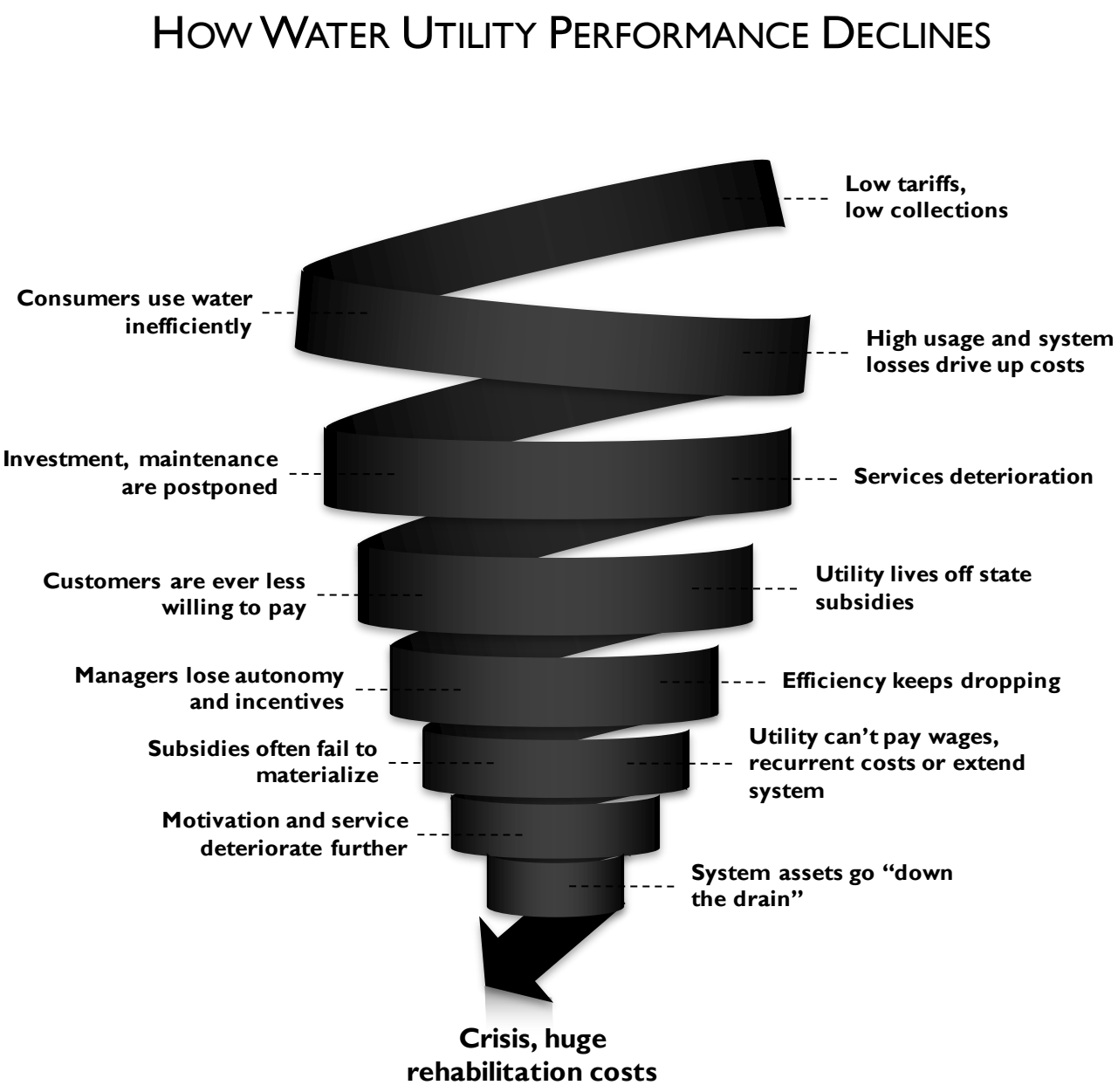

Figure 2-8 Vicious Downward Spiral of Weak Performance (represented by the researcher from Baietti *et al.*, 2006)

Chapter 3

Approach and Methodology

In general, as the literature provides, research in the water supply and sanitation (WSS) sector can be carried out at very different levels (Figure 3-1):

- At the macro or the institutional level (at the broad level)
- At the meso or market level
- At the micro level or the level of the water company (at the utility level)

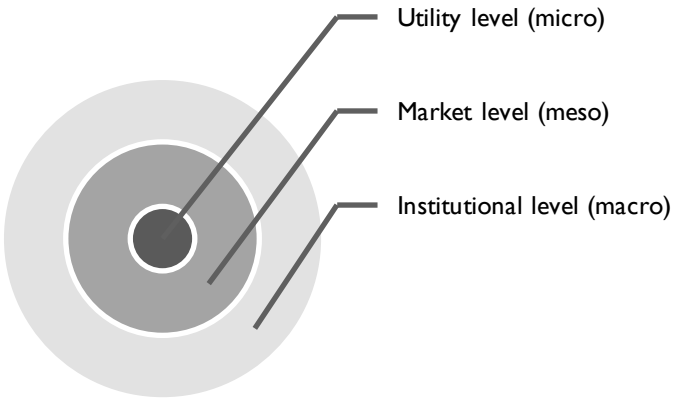

Figure 3-1 Levels of Research in the WSS Sector

In this study, the research work will be at the micro level for designing and implementing Utility Reform. It will discuss how the research can help to design a comprehensive reform plan to suit the situation of Jerusalem Water Undertaking (JWU).

Throughout the research the "Utility Reforms" of Jerusalem Water Undertaking will be prepared in seven steps. Each step corresponds to a discussion topic in this research and will satisfy a set objective. Figure 3-2 is a diagrammatic representation of the thesis concept and approach.

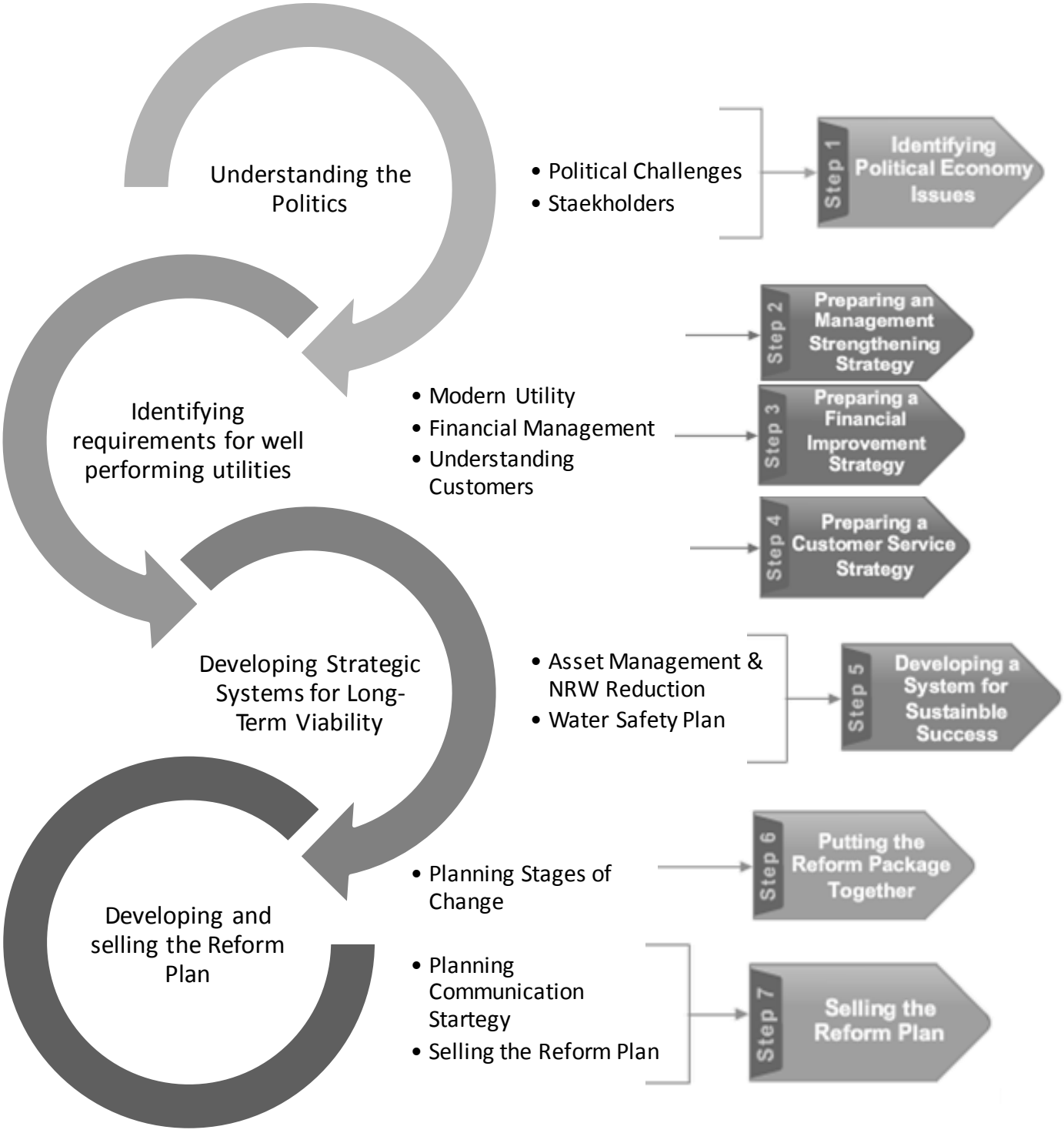

Figure 3-2 Thesis Concept Diagram for the Development of the Utility Reform Plan (represented by the researcher based on World Bank, 2015)

The reform plan will be visited throughout chapter 5 to complete all steps. By the end of the research, a set of reform actions should be in place targeted to the own circumstances of JWU.

The research will make use of a utility analytical framework developed by (Baietti *et al.*, 2006). This analytical framework is grounded on the principles of "New Public Management (NPM)" which is a direction in public sector reform that focuses on outputs (using management processes from the private sector) as an alternative to "traditional, hierarchical, rule-bound systems" (Baietti *et al.*, 2006).

The analytical framework combines two principal perspectives. The first deals with the "external environment", describing the institutional, economic, and social context in which the service provider operates. The second deals with the "internal functioning of the utility", mostly oriented toward decision-making processes and management practices, and encompasses issues such as financing, strategic planning, management information systems, human resource management, etcetera (Baietti *et al.*, 2006). For this, the framework uses various indicators proposed for assessing: (i) external autonomy; (ii) external accountability; (iii) internal accountability for results; (iv) market orientation; (v) customer orientation; and (vi) corporate culture.

Pragmatically, the analytical work will proceed in this way to: (i) measure the performance of the WSS service; (ii) explain apparent performance gaps; and (iii) design reforms to improve the operations efficiency and enhance the reliability, sustainability and affordability of the service, and increase access to the infrastructure. The year 2015 is the baseline for data and the research study, if not stated otherwise.

The results of this research were drawn from a mixture of various sources, which included a desk review of literature including extensive review of public water utilities case studies, field research of the case study JWU, and analyzing operational experience from professionals in the sector. The research made use of an extensive participation in meetings with the relevant stakeholders in the sector, and drew from a wide body of knowledge of the World Bank in the areas of "public sector management", with particular focus on the WSS sector.

Consultations were also carried out with the sector stakeholders relevant to JWU. This was done through (a) participation in local workshops with the stakeholders including the JWU top management, and local and international consultants, held at JWU during the course of the preparation of the research thesis, (b) partaking into one-on-one and group interviews, (c) participating in regular meetings with the donor, the JWU management, and (d) other correspondence and exchange of materials.

Chapter 4

Case Study Description

4.1 Historical Background

Until the later 1950, the population of the cities of Ramallah and Al Bireh depended almost entirely on cisterns for drinking water with very few local springs. In 1949, Ramallah and Al Bireh Company was established in order to deal with the burden of the increase in water demand as a result of the influx of Palestinian refugees into the area following the war of 1948 (JWU, 1995).

The new company concluded an agreement with Arab East Jerusalem Municipality to draw on Ein Fara Springs north east of Jerusalem. A distribution network and a main pipeline were constructed with the aim to convey water from Jerusalem to the Ramallah and Al Bireh area. However, the limited quantities of water were insufficient for the served population (JWU, 1995, 2001).

In 1963, an agreement was concluded between the Jordanian Government and the International Development Agency (JWU, 1995, 2000), and the Ein Samia water project was implemented to fulfil the shortage of water in the District. Two wells were drilled, a main reservoir was constructed on Jabal Al Taweel and a transmission line was constructed from the two wells to the reservoir (JWU *et al.*, 2000).

In 1966, law No. 9 was issued providing the establishment of Jerusalem Water Undertaking (JWU) with the mandate to develop new water resources control all water projects in the area and to provide the population with their needs of water for drinking and other municipal and domestic purposes (JWU *et al.*, 2000). According to this law, JWU was established as a non-profit, independent, civil organization run by a Board of directors (JWU, 1995, 2001), and was authorized to prescribe water tariffs, with cost of services, collection procedures, and financial, administrative and technical regulations to be approved by its Board of Directors (PWA *et al.*, 2000).

Since the occupation in 1967, the Israeli Military Authorities subjected all works and projects pertinent to water and water resources to its direct control through the Military order No.92/1967. The said order prevented any organization or undertaking from the

execution of any work connected to management, maintenance and development of water services or resources without obtaining prior approvals and licenses from these Authorities (JWU, 1995, 2001).

Furthermore, in 1982, the Israeli Occupation Authorities dissolved the city councils of Ramallah and Al-Bireh, thus disabling the JWU Board of Directors that consists of two members of each city from performing its duties. For five years and without the Board of Directors, JWU's top management met the challenge and made all daily and strategic decisions to achieve the Undertaking's mission (JWU, 1995; 2001).

At the end of 1987, the mass public uprising "Intifada" started in the Occupied Palestinian Territories. The whole political, social and financial situation in the area changed. Many people were put out of work, thus putting an extra burden on JWU. Though these tough days of Intifada, the Undertaking managed to survive and even came out stronger than ever (JWU, 1995; 2001).

In the wake of the rule of the PNA, the Palestinian Water Authority (PWA) was established in 1995 assuming the regulation powers of the water sector in Palestine. In 1996, the Government representative in the Board of Directors of JWU was invited to join the Board for the first time since 1967 (JWU, 2001).

As a result of the presidential decree that changed the name of Ramallah and Al-Bireh Governorate, the Board decided in 1998 to change the name of JWU (Ramallah District) to Jerusalem Water Undertaking (Ramallah and Al-Bireh District) (JWU, 1995; 2001).

In 2011, a ministerial decree was issued to authorize JWU with the management of waste water services and the collection of the related fees within its jurisdiction. This decree No. 13/107/14 of October 2011 also called all stakeholders in charge to perform all institutional and financial arrangements necessary for that.

Now and for more than five years, JWU is undertaking an institutional development process in order to cope with the future challenges, mainly those dealing with its sustainability and the expected integration of wastewater services in the central area of the West Bank into its services portfolio (JWU, 2001).

4.2 JWU Service Area

The JWU, being located in Ramallah & Al Bireh Governorate, is regarded as a central regional water utility where its service area would comprise the Governorates of Jerusalem and Ramallah & Al Bireh. The service area would cover about 1,200.0 square kilometres (ARIJ, 2014) and would consist of 119 localities with a total population of 767,218 people in the year 2015 (PCBS, 2015).

There are 119 localities in both Governorates, 21 of which have the status of Municipalities (PCBS, 2015). The other localities are governed by village councils or local councils. In addition, there are five refugee camps[1].

According to the latest administrative subdivision of the West Bank, Jerusalem Governorate extends east-west direction to form a 'Z' shape just under Ramallah & Al Bireh Governorate. Jerusalem and Ramallah and Al Bireh Governorates are located in the middle part of the West Bank. The governorates together extend from the 1949 Armistice line in the West to Jericho Governorate and the Dead Sea in the East and from Bethlehem Governorate in the south to Salfit and Nablus Governorates in the north.

In terms of land coverage, Jerusalem Governorate covers 344.452 km^2 of land; 34.257 km^2 of these are Palestinian built-up areas (ARIJ, 2014), and the rest hold various different land classifications including occupation settlements with around 281,684 settlers in 2013 (PCBS, 2015). The average population density in Jerusalem Governorate is reaching 1,215 person/km^2 (PCBS, 2015). Ramallah & Al Bireh Governorate has an area of 855.587 km^2 (ARIJ, 2014), and due to restrictions imposed by the occupation, the average Palestinian built-up areas are very limited with approximately 46.519 km^2 (ARIJ, 2014) and comprise only 5.44% of the Governorate area. The average population density is calculated as 407 person/km^2. Functionally, there are eight major land use classes within Ramallah & Al Bireh Governorate boundaries. These are Palestinian built-up areas, occupation settlements, closed military areas and bases (of the occupation), nature reserves, forests, cultivated areas and industrial areas (ARIJ, 2006). Occupation settlements, nature reserves or closed military areas occupy approximately 20.3% of the Governorate area (ARIJ, 2006).

Table 4-1 shows the area, number of population in 2015, number of localities, and the distribution of local authorities according to the type of local authority per governorate.

The present area of operations of JWU extends over 600 km^2 with around 61,600 subscriptions serving almost 335,000 people (JWU, 2015). It covers the northern part of Jerusalem and the central and eastern parts of Ramallah & Al Bireh Governorate. JWU currently serves 17 municipalities[2] including the twin cities Ramallah and Al Bireh and 33 villages and 5 Refugee Camps including Qaddura and Silwad Refugee Camps[3].

[1] The (PCBS, 2015) indicated 5 refugee camps; one in Jerusalem Governorate and four in Ramallah & Al Bireh Governorate. Whereas, (OCHA, 2015) counted the 5 refugee camps as follow: two (i.e.; Shu'fat and Qalandiya) in Jerusalem Governorate, and three (i.e.; Al Am'ari, Al Jalazun and Deir 'Ammar) in Ramallah & Al Bireh Governorate. Shu'fat Camp is the only camp located within Israeli's unilaterally declared Jerusalem Municipality area, and the Palestinian moves there to maintain their Jerusalem ID (OCHA, 2015).
[2] The figure includes Betunia Municipality which is supplied by JWU in bulk (i.e.; Betunia Municipality is responsible for the provision of water supply services to their citizens including the O&M of the network).
[3] Camp count is as per JWU registered customers' accounts of localities.

Table 4-1 Number of Population (2015), Number of Localities, and the Distribution of Local Authorities according to the Type of Local Authority per Governorate

Governorate	*Area (km^2)*	*Number of Localities*	*Number of Population*	*Type of Local Authority*				
				Municipality	*Village Council*	*Local Council*	*Camp*	*Total*
Jerusalem	344.5	44	419,108	1	18	10	1	30
Ramallah & Al Bireh	855.6	75	348,110	20	47	0	4	71
Total	1,200.0	119	767,218	21	65	10	5	101

Figure 4-1 depicts the extent of the present JWU's services in the two Governorates showing the localities which are being served by JWU.

Figure 4-1 Jerusalem and Ramallah & Al Bireh Governorates' and their Localities' Administrative Boundaries and the Extent of the Current Service Area of JWU (produced by the researcher)

And Table 4-2 summarizes in numbers the localities and the population served by JWU in each governorate.

Governorate	*Number of Localities Served by JWU*	*Number of Population*	*Population Unserved by JWU*	*Number of Population Served by JWU*	*JWU Coverage in percent*
Jerusalem	12	419,108	327,928	91,180	21.8%
Ramallah & Al Bireh	43	348,110	104,269	243,841	70.0%
Total	55	767,218	432,197	335,021	43.7%

Annex 1 (a. & b.) present generic list of localities in each governorate, in Jerusalem and in Ramallah & Al Bireh respectively with an illustrative map, and identify the localities which are served by JWU. In addition, the lists designate the 2015 population per

locality, the JWU distribution zones (with corresponding JWU identification number), the type of the locality (urban, rural or refugee camp) and the year of subscription to JWU.

4.3 Population

The population in Jerusalem and Ramallah & Al Bireh Governorates in 2015 totaled 767,218 persons: 419,108 in the Jerusalem Governorate and 348,110 in the Ramallah & Al Bireh Governorate (PCBS, 2015).

The present population of JWU as of 2015 is 335,021 persons, representing approximately 43.7% of the total Jerusalem and Ramallah & Al Bireh Governorates population (21.8% of the total population of Jerusalem Governorate; 70% of the total population of Ramallah & Al Bireh Governorate).

According to the PCBS's classifications (PCBS, 2015) of the types of Palestinian localities, these populations are classified into three planning categories as given in Table 4-3. The classification is based on the population size.

2015 population figures are based on PCBS published information for individual communities. The development of the future populations will take into consideration the current state of the localities and the projected growth rates (JWU *et al.*, 2015). The growth rates of the PCBS are assumed to be 2.5% for the year 2020 and is expected to decrease progressively to 2.4% by year 2030 and 2.3% by the year 2040. Accordingly, the population of the present service area will be about the double in the next 30 year.

This increase in population, according to PCBS projections, is supposed to be spread over the entire area. However, population forecasts for some built-up areas may increase at lower pace (JWU *et al.*, 2015).

In the long term, it is envisioned that the JWU service area will extend over Jerusalem Governorate and the entire Ramallah & Al Bireh Governorate. In such a case, the population to supply will be more than triple from now (PWA *et al.*, 2000; JWU *et al.*, 2015).

Table 4-2 Classification of Population according to the Type of the Palestinian Localities (produced by the researcher based on PCBS, 2015)

Type of Locality	*Jerusalem Governorate*		*Ramallah & Al Bireh Governorate*		*Total Governorates*		*Present JWU Service Area*	
	Number of Population	*%*	*Number of Population*	*%*	*Number of Population*	*%*	*Number of Population*	*%*
Urban (population more than 5000)	362,213	86.4%	180,587	51.9%	542,800	70.7%	194,593	58.1%
Rural (population less than 5000)	46,751	11.2%	147,299	42.3%	194,050	25.3%	112,344	33.5%
Refugee Camps	10,144	2.4%	20,224	5.8%	30,368	4.0%	28,085	8.4%
Total	419,108	100%	348,110	100%	767,218	100%	335,021	100%

	Number of Population	*%*	*Number of Population*	*%*	*Number of Population*	*%*	*Number of Population*	*%*
Urban (population more than 5000)	362,213	86.4%	180,587	51.9%	542,800	70.7%	194,593	58.1%
Rural (population less than 5000)	46,751	11.2%	147,299	42.3%	194,050	25.3%	112,344	33.5%
Refugee Camps	10,144	2.4%	20,224	5.8%	30,368	4.0%	28,085	8.4%
Total	419,108	100%	348,110	100%	767,218	100%	335,021	100%

4.4 Topography

Jerusalem and Ramallah & Al Bireh Governorates are sited in the central highlands region between the Mediterranean Sea and the northern edge of the Dead Sea. The elevation of Jerusalem Governorate varies from 209 m above sea level in the southeast, to 859 m above sea level in the west. The lowest elevation is at Al Ka'abina (Tajammu' Bawadi) (ARIJ, 2014). And the highest point in Ramallah & Al Bireh Governorate is 1022 m above mean sea level at Tal A'sur, whereas the lowest elevation is 100 m below sea level at the southeast corner of the governorate (ARIJ, 1996), as shown in Figure 4-2.

The mountain system in Jerusalem and Ramallah & Al Bireh Governorates is composed of three main groups, the "eastern slopes' hills", "central mountain crests" and "western slopes' hills" (ARIJ, 1996; Ramallah Municipality *et al*, 2010).

- The eastern slopes are located between the Jordan Valley and the central mountains. These are characterized by steep slopes which contribute to the formation of young wadis such as "wadi El-Maquk" (ARIJ, 1996).
- The mountain crests form a steep water divide line (watershed line) that separate the eastern and the western slopes. Average ground surface elevations range between 750 and 800 m above mean sea level (amsl).
- The western slopes are characterized by gentle slopes. Ground elevations range between 250 and 500 m amsl.

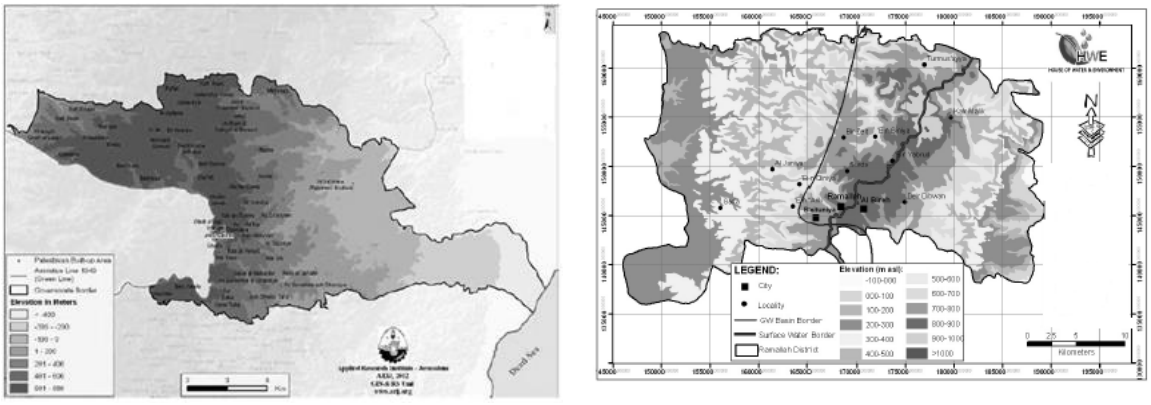

Figure 4-2 Topographic Maps of Jerusalem Governorate (to the left, after ARIJ, 2014 edited) and of Ramallah & Al Bireh Governorate (to the right, after Gauff *et al.*, 2010 edited)

Two major drainage systems are distinguished in Jerusalem and Ramallah & Al Bireh Governorates as illustrated in Figure 4-3. The first system runs to the west towards the Mediterranean such as "Wadi Salman" in Jerusalem Governorate and "Wadi El Shamiyah", "Wadi Salman", "Wadi Sarida", "Wadi El Durlb" and "Wadi El Kabeir" in

Ramallah & Al Bireh Governorate. The second system runs to the east towards the Jordan River such as "Wadi Soneit", "Wadi Farah", "Wadi El Mukallak", "Wadi Daber" and "Wadi Al Nar" in Jerusalem Governorate and "Wadi El Maquk" and "Wadi El Ein" in Ramallah & Al Bireh Governorate. To be Noted that the surface water divide and the groundwater divide do not coincide.

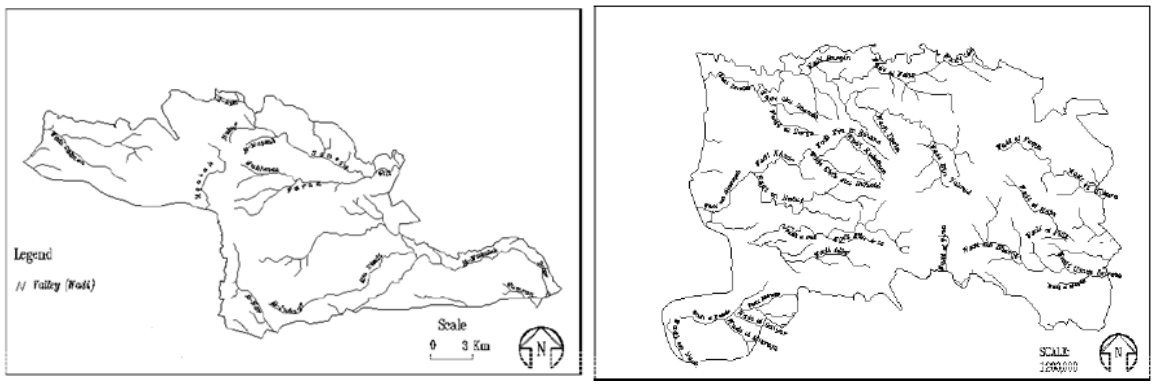

Figure 4-3 Drainage System in the Jerusalem Governorate (to the left, after ARIJ, 1996 edited) and of Ramallah & Al Bireh Governorate (to the right, after ARIJ, 1996 edited)

The elevation identified in the present JWU service area ranges from 440 amsl (Ein Samia well field, Figure 4-4) to 1022 amsl (Tal Tal A'sur hill).

Figure 4-4 Ein Samia Plains (Ein Samia Well Field) (after JWU, 2001)

4.5 Soils

Jerusalem Governorate is made of at least nine (9) different soil associations (ARIJ, 1996), while Ramallah & Al Bireh Governorate is made of 6 soil types (ARIJ, 1996) sharing 5 with Jerusalem Governorate (Figure 4-5).

The dominating soils in both governorates are Terra Rosa, Brown Rendzinas and Pale Rendzinas and Brown Lithosols and Loessial Arid Brown Soils. These major soil associations are described as follows:

- "Terra Rossa, Brown Rendzinas and Pale Rendzinas": These types of soil associations collectively cover an area of 12,576.42 hectares (about 40%) of Jerusalem Governorate and occupy approximately 58,504 hectares (nearly 70%) of the Ramallah Al Bireh Governorate (ARIJ, 1996). The parent materials from which this soil originally was initiated, are mainly dolomite and hard limestone. This type of soil is a characteristic of the hilltop areas with numerous rock outcrops that could reach to about 30- 50% (Ramallah Municipality *et al.*, 2010). Different soil slopes are permanent in such type of soil according to various topography and elevation. Accordingly, different soil depths ranging from 0.5-2 meters are found in different

areas of this type of soil. In General, this soil has a pH range of 7.5-8.1 with clay-to-clay loam soil texture.

- "Brown Rendzinas and Pale Rendzinas": These types of soil associations occupy an area of about 9,652.95 hectares in Jerusalem Governorate and 15, 870 hectares in Ramallah & Al Bireh Governorate. Around 30- 50% of these soils are outcropped with rocks (ARIJ, 1996). Slope gradients vary greatly, reaching 3% at the hilltops and rising to 30% at the mountainous areas. The soil depths of this type vary accordingly, starting from 0.5 meter at the mountainous areas and up to 2 meters at the hilltops. Parent materials are mostly hard and soft chalk. The pH is mainly neutral to slightly basic 7.5-8 (Ramallah Municipality et al., 2010).
- "Brown Lithosols and Loessial Arid Brown Soils": These types of soil associations cover about 5,354.48 hectares of Jerusalem Governorate and 6,866 hectares of Ramallah & Al Bireh Governorate. This soil characterizes the eastern slopes of both governorates and is mainly found on steep to moderate rocky and eroded slopes. "Brown lithosols" are found in the pockets among the rocks. "Loessial arid brown soils" are found of flat hilltops, plateau and foot-slopes, the parent rocks of this soil association are chalk, marl, limestone and conglomerates (ARIJ, 1996). The texture of this type of soil is mainly loamy. The pH of the soil is alkaline 8-8.2. The soil has a major restriction represented by the formation of hard crust on the surface; this is due to weak soil structure and the lack of adequate organic matter that serves as an aggregation agent (Ramallah Municipality et al., 2010).
- Many other types of soil are present in the Governorates, but each type cover very small percent of the total of each governorate area.

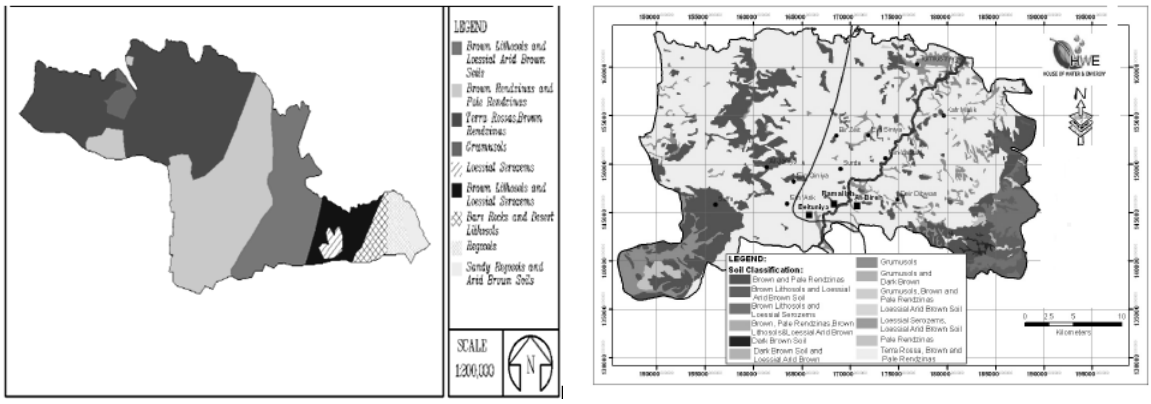

Figure 4-5 Soil Types Distribution in Jerusalem Governorate (to the left, after ARIJ, 1996 edited) and in Ramallah & Al Bireh Governorate (to the right, after Ramallah Municipality *et al.*, 2010 edited)

Since "Terra Rosa" is a dominant soil type in the service area, subsurface network construction is generally costly, due to its rocky nature, which had led in the past to have aerial/above surface pipelines (Figure 4-6). Generally, these soil types, are not aggressively corrosive, which helps the pipes to have a longer lifetime (PWA *et al.*, 2000; JWU *et al.*, 2015).

Figure 4-6 16" & 10" Conveying Lines between Main and Booster Stations Ein Samia (after JWU, 1995)

4.6 Climate

The climate in the service area is "Mediterranean climate" with cool rainy winters and warm dry summers (ARIJ, 1996 and ARIJ, 2014).

The mean annual temperature varies from 15 to 20ºC (ARIJ, 2014). The coldest month is January with an average temperature of 6-12 ºC, while the hottest month is August with an average temperature of 22-27 ºC (Ramallah Municipality *et al.*, 2010).

Rainfall is limited to the winter and spring months, mostly between November and May; summer is completely dry. Snow and hail, although infrequent, may occur in the area especially over the mountains crests. In general, the distribution of rainfall is strongly influenced by the topography, with higher rainfall in the mountains and hills. Rainfall in the area also shows considerable inter-seasonal variation. There are about 40-70 rainy days per year (Ramallah Municipality *et al.*, 2010).

The mean quantity of rainfall in Jerusalem Governorate varies from year to year. The long term average annual rainfall reaches 584 mm (ARIJ, 1996), with an average regional humidity of 60.32% (ARIJ, 2014). In 2011, the average yearly rainfall was estimated at

409.47mm, with some substantial differences in the yearly rainfall averages across localities (Figure 4-7). The highest registered rainfall (2011) was 607.77mm in Beit Surik, whilst the lowest was 211.17 mm (ARIJ, 2014). There was peak annual rainfall in 1991/92 when it reached 1,134 mm (ARIJ, 1996).

The annual rainfall quantity in Ramallah & Al Bireh Governorate in 2015 was 612.4 mm with 61 rainy days (PCBS, 2015). The average annual rainfall in the eastern part of the governorate varies from 200 to 450 mm. In the western part of the governorate, the average annual rainfall is higher than the eastern part; it varies from 350 to 550 mm (Ramallah Municipality *et al.*, 2010). In the mountains the average annual rainfall heights vary from 550 to 700 mm (Ramallah Municipality *et al.*, 2010). The mean relative humidity in Ramallah & Al Bireh Governorate was 68% in 2015 (PCBS, 2015) and reaches its highest rates during the months of January and February (Ramallah Municipality *et al.*, 2010). In years of extreme rain, 1982/83 and 1991/92, floods and extensive soil erosion occurred because of the high rainfall intensity. The steep slopes of Birzeit and Betunia receive most of the precipitation ranging between 400 and 900 mm (ARIJ, 1996). Snow falls occasionally during the winter. The largest snowfall on record came on February 9, 1920 when one and quarter meters of snow fell on the Governorate (ARIJ, 1996).

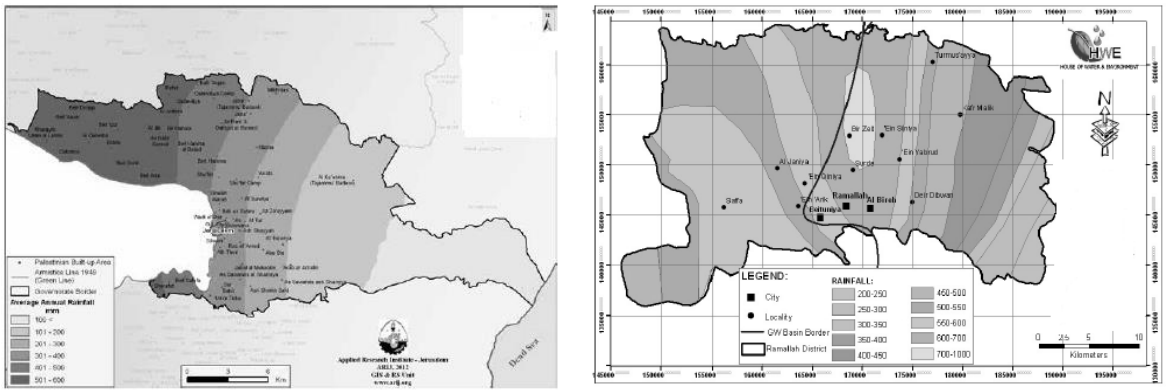

Figure 4-7 Mean Annual Precipitation in (mm / year) in Jerusalem Governorate (to the left, after ARIJ, 2014 edited) and in Ramallah & Al Bireh Governorate (to the right, after Ramallah Municipality *et al.*, 2010 edited)

During the winter season, the rain-bearing winds move in a general West East direction with an average daily wind speed of 12.5 km/h in December, causing precipitation (PWA *et al*,. 2000). But during summer they are northern west and northern east, hot & dry with an average wind speed of 18.6 km/hour in August (Ramallah Municipality *et al.*, 2010). The Mean Wind Speed recorded at Ramallah station in between the years 2007-2015 varies from 8.5 to 11.7 km/hour (PCBS, 2015). Khamaseen winds affect the area between April and June (ARIJ, 1996) and fairly common in Autumn (ARIJ, 2014). These

winds bring high temperatures and reduced humidity, as these winds blow frequently from the Arabian Desert, full of dust and sand (ARIJ, 1996).

Evaporation is particularly strong in summer, due to high temperatures, low air humidity and cloudless sky. The average monthly evaporation as measured at the Jerusalem central weather station by the pan method reaches 1,874 mm per year (ARIJ, 1996) while in the eastern parts of Jerusalem Governorate, the evaporation rates are extremely high, averaging 2,600 mm annually (ARIJ, 1996). The evaporation quantity measured in Ramallah station in 2015 was 1,754.4 mm (PCBS, 2015). In the western slope areas of Ramallah & Al Bireh Governorate, the evapotranspiration rate is lower than in other regions, it varies from 1,900-1,950 mm/yr. The evapotranspiration rate in the mountain crests of Ramallah and Al-Bireh varies from 1950 to 2000 mm/yr. In the eastern slope areas of Ramallah & Al Bireh Governorate, the evapotranspiration rate is the highest; it varies from 2,000 to 2,150 mm/yr (Ramallah Municipality *et al.*, 2010).

4.7 Geology

The geological structures of Jerusalem Governorate consist of the following units, arranged by age from older to younger: (1) Nubian sandstone, dolomite and marl of "lower cretaceous age"; (2) Limestone, dolomite and marl of "Cenomanian to Turonian ages"; (3) Chalk and chert of "Senonian age"; (4) Metamorphic rocks of "Miocene age"; (5) Chalk, marl and conglomerate of "Pleistocene to Recent ages" (ARIJ, 1996).

The geological formations of Ramallah & Al Bireh Governorate range in age from "Lower Cretaceous" to "Quaternary". Lithological composition of these formations consists mainly of limestone, dolomite, marl, chalk, cherts and alluvium (ARIJ, 1996).

Cretaceous and Tertiary rock formations are characterized by marine carbonate sediments such as limestone, dolomite, chalk and marl, frequently interspersed with chert nodules. Recent rocks are mainly wadi fill and Nari deposits (Ramallah Municipality *et al.*, 2010).

Figure 4-8 is geological/hydrogeological map of Jerusalem Governorate and in Ramallah & Al Bireh Governorate.

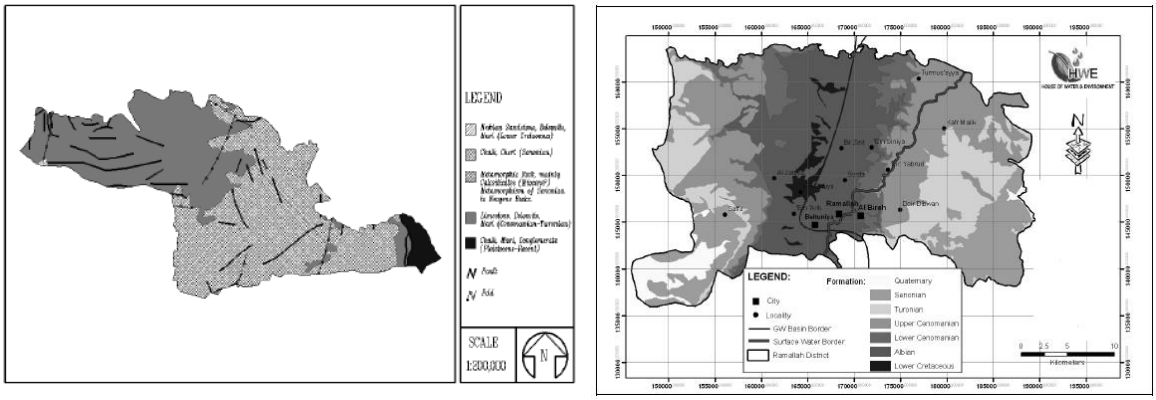

Figure 4-8 Geological Map in Jerusalem Governorate (to the left, after ARIJ, 1996) and in Ramallah & Al Bireh Governorate (to the right, after Ramallah Municipality *et al.*, 2010 edited)

4.8 Piped Water Supply System

According to the PCBS's survey conducted in 2015, 43 (out of 44) localities in Jerusalem Governorate and 74 (out of 75) localities in Ramallah & Al Bireh Governorate are served by public water networks. People in the governorates who do not have access to piped water depend upon local springs or cisterns for water supply and on water supplied by tankers from nearby sources in the area (ARIJ, 2014). Approximately 43.7% of the population in 12 localities in Jerusalem Governorate (21.8% of the governorate's population) and 43 localities in Ramallah & Al Bireh Governorate (70% of the governorate's population) has access to the piped water supply through JWU.

In the Jerusalem Governorate, there are 32 listed localities that are not served by JWU, located within the occupation's unilaterally declared Jerusalem Municipality area and in the north-western and eastern parts of the Governorate. East Jerusalem is supplied by a network operated by the occupation water company of "Hagihon" with approximately 100% coverage of connected housing units (ARIJ, 2012), 24/7 quality water services and water pricing ranging between 7 to 15 NIS per m^3 depending on the quantity of water consumed (ARIJ, 2014). Shu'fat Refugee Camp is connected to a public water network which was established in 1976 and funded by the camp residents in order to get water through a reservoir belonging to UNRWA (ARIJ, 2012). The camp's residents are suffering of acute water crisis because of the reduced amounts of water supplied and the frequent cut offs of water (ARIJ, 2012). Hagihon Company is the body responsible for water supply in the camp. In areas outside East Jerusalem, infrastructure and services are provided by either the Palestinian local or village councils. Both, however, lack enough funding and capabilities to develop these areas. Local councils therefore could barely provide basic services to these communities (ARIJ, 1996). They are supplied by water in bulk by the WBWD through their public water networks. The water resources are divided into two main sources: local own resources mainly from wells (such as El Eizariya well), and purchased resources from Mekorot or Hagihon water companies, however, with high dependency on purchased water which represents about 85% of the total resources (ARIJ,

2014). Network coverage in some of these localities is incomplete, as well as, connection to a network alone does not automatically translate into a regular and constant water supply. Many communities suffer from poorly-designed and maintained water infrastructure and the very limited quantities of water supplied through the network (4.7 MCM in 2011) with average consumption rate not exceeding 53 lpcd in 2011, and high percentage of water losses through leaking pipes from the source to suppliers and at the local level overall estimated at 33% in 2011 (ARIJ, 2014).

In the Ramallah & Al Bireh Governorate, there are also 32 localities which are not served by JWU located in the western part of the governorate. In most of the areas, there are independent water distribution systems, managed by the local authorities which purchase the bulk water from Mekorot through the WBWD and deliver the water to area residents. In all cases, the water distributed to customers is obtained from Mekorot through independent connections to the Mekorot System. Approximately, 2.45 MCM were purchased in 2013 from Mekorot through the WBWD (JWU *et al*, 2015). In general, the water supply is almost always continuous. The water delivered by Mekorot to these communities translates to a per capita purchase rate with an average value of about 97 lpcd (JWU *et al.*, 2015). Considering that these are primarily rural areas with little commercial/industrial water use, this reflects a rather low rate of actual water consumption with an average value of 71 lpcd. The water losses in terms of NRW in the individual networks of these communities varied from a high value of 59% to a low value of 10% in 2013 with an overall average of about 26.6%. In general, most communities are charged about 2.6 NIS per cubic meter of water received. They in turn charge a minimum of 4 NIS per cubic meter of water delivered to customers (JWU *et al.*, 2015).

At present, there are no discussions between JWU and any of the localities which are currently unserved by JWU regarding a possible merger or integration by JWU (JWU *et al.*, 2015), despite of the existence of the enabling legal environment after the enactment of the new water law of 2014 favoring the aggregation of the services into regional utilities. However, when such discussions are held, both the JWU and the local government authorities will have certain demands that may have to be met prior to any integration between the entities, besides, a roadmap has to be decided between the parties which will be a plan for the integration where it includes several steps that have to be made in order to have smoothly process (JWU *et al.*, 2015).

4.9 General Description of JWU Water Supply System

The JWU water supply system covers the northern part of Jerusalem and the major part of cities and villages of Ramallah & Al Bireh Governorate located in the central part of the West Bank, with 61,598 subscriptions spread within 55 localities. All of these localities are directly supplied by JWU except Betunia Municipality which is supplied in bulk. The network shown on Figure 4-9 (General Layout of Main Facilities) extends:

- North to the Ramallah & Al Bireh Governorate border and south to Beit Hanina village;

- West to the Kufur Ni'meh village and east to Ein Samia village.

The age of around 65% of the existing water network is between 25 and 50 years old. The network pipes were constructed in different time periods, and their laying was usually done piece by piece according to connection requirements and no standards were used for the construction of the network in the past.

The existing water supply system is fed from 3 main sources:

- Ein Samia wells through Ein Samia main pumping station and booster station;
- Beitunia reservoir & connection (supplied through the WBWD by Mekorot) through Ramallah pumping station; and
- Shu'fat connection supplied through Hagihon water company in Jerusalem,

and 6 other smaller sources injecting about 3.2% of the total water supplied (in 2015) located in:

- Entrance of Hizma village;
- Al Ram;
- Kufur Ne'meh;
- Deir Ibzei;
- Um Safa; and
- Al Jib.

Accordingly, JWU resources of water are composed of own resources (produced water) and external resources (purchased water representing about 87% of total water supplied in year 2015) as follows:

- Water resources owned by JWU, which are Ein Samia wells. These wells produced in 2015 around 2.23 MCM, which represented around 13% of the total water supplied;
- External water resources mainly purchased from Mekorot through the WBWD at Betunia connection. Around 15.1 MCM have been purchased in 2015 (representing 68.1% of total water supplied);
- The secondary external water resources are purchased from Hagihon water company in Jerusalem and produced some 3 MCM in 2015. They are entered into the system at Shu'fat mainly and Hizma, and AL Ram connection marginally added to them for the first time after its introduction in mid-year 2015;
- The tertiary external water resources purchased through the WBWD from Mekorot. It produced some 284 thousands m^3 in year 2015, and are located in Um Safa, Kufur Ne'meh, Deir Ibzei and Al Jib. These sources are used of local consumption.

Based on the available water sources mentioned above, the present JWU service area is divided into three main water supply areas: (1) Ein Samia supply area which is served by the Ein Samia wells, (2) Ramallah & Al Bireh supply area which is served by Ramallah Booster Station; and (3) Jerusalem supply area which is supplied from the connections at

Shu'fat and Hizma. Besides, there are other three local (isolated) supply areas at Kufur Ne'meh, Deir Ibzei and Um Safa, where each village is served by its independent connection to the system.

The existing main facilities of the JWU water supply system are the following listed from north to south:

- Ein Samia Wells No. 1, 2, 3, 4 and 6 and well pumps: only wells 1, 2 and 3 works to pump regularly into the system.
- Ein Samia Main Pumping Station and rservoir: four pumps installed in parallel pumps water coming from Ein Samia wells through a main reservoir to the balancing reservoir of Ein Samia Booster Station. Figure 4-9 is a picture of the Reservoir of Ein Samia Main Pumping Station;
- Ein Samia Booster Station and reservoir: four pumps installed in parallel pumps water coming from Ein Samia main pumping station into the 400 mm diameter main pipe which runs past the Al Mazra'a Al Sharqia Booster Station to Beit Eil junction where it is terminated (the junction connection to the 250 mm pipeline delivering water to Jabal Al Taweel reservoirs was cut);
- Al Mazra'a Al Sharqia Booster Station: pumps water from the 250 mm diameter main pipe to the 150 mm pipeline heading north to Al Mazra'a Al Sharqia village and then west;
- Al Mazra'a Al Sharqia Balancing Tower: is no more in operation (demolished);
- Jabal Al Taweel Balancing Reservoir: is a balancing reservoir that should absorb the water demand variation of Ramallah and Al Bireh localities and secures the distribution in cases of emergency, the reservoir is currently non-functional;
- Ramallah Booster Station: consists of 5 canned pumps in parallel, as shown in Figure 4-10, and pumps purchased water near Beitunia reservoir into the 600 mm diameter main pipe which extends about 1400 m up to the ring 250/400 mm line and ultimately continued as 375 mm pipeline to Jabal Al Taweel reservoirs.

In addition, there are the following accompanying facilities:

- Eastern Villages Booster Station: is located at the ending of the 250 mm pipeline near the slaughter house northeast of Al Bireh city. It was put in operation since 2014 and serves as an emergency booster station to supply water from Ramallah Pumping Station System to the eastern villages of the service area (these villages are supplied by Ein Samia System during normal operation conditions);
- Deir Dibwan Reservoir: receives water from Ein Samia system and distributes it to the customers in Deir Dibwan through the local distribution system;
- Birzeit Reservoir: serves as a main reservoir receiving water from the distribution system through 250 mm pipeline and delivering this water to area residents.
- Ein Sinya Ground Reservoir: receives water directly from the distribution system and delivers it to the high points in the Ein Sinya area.
- Atara Booster Pump Station: receives water directly from the distribution system and delivers it to the Atara reservoir;

- Atara Reservoir: is filled by water by the Atara Booster Station and delivers water to the consumers in the area through the local distribution system.
- Jawwal Booster Station: receives water directly from the distribution system and delivers it to the high points in the Jawwal area north of Al Bireh city.
- Kufur Ne'meh Reservoirs (1 and 2): receive water directly from the Mekerot system and delivers it to the area residents.

Figure 4-9 Main Pumping Station Reservoir Ein Samia (after JWU, 1995)

The main facilities of the system, wells, pump and booster stations and reservoirs are remotely controlled and monitored by JWU through central SCADA control system. A log of all the operations is available, which helps in the follow up of the system and gives a statistic database on water production and operation.

Starting from the main facilities, distribution systems are developed throughout the service area. The distribution system consists of different networks, which are directly connected to the transmission lines, and are either isolated networks taking water from main lines in one entrance point (the case of most small localities), or connected systems (loops) taking water from main lines in several entrance points (the case of municipalities).

Figure 4-10 Ramallah Pumping Station (after JWU *et al.*, 2015)

JWU divided the whole distribution system into 80 units (distribution zones). These units have been created over time, mainly for historical and administrative purposes (PWA *et al.*, 2000). Today, these zones are close to hydraulic units, but are principally administrative units, defined and sized in a manner that facilitates billing. These billing areas, depending on the size and the location, may cover an entire locality or a service area within a town (PWA *et al.*, 2000).

The size of the pipes in the transmission system, supplying water from sources to the localities, ranges from 200 mm to 600 mm. And the size of the pipes in the distribution system varies from 12.5 to 150 mm.

The total length of the whole system, transmission and distribution, reached about 1300 km in 2015. About 59% of all pipes are of diameters of 50 mm and less.

Generally, pipes in the JWU service area have primarily been constructed in Steel (representing 60% of the pipes length) and Galvanized Steel (representing 45% of the pipes length) with very small sections of Ductile Iron and PVC. Recently, JWU took the decision to use Ductile Iron pipelines (for diameters $\geq$ 150 mm) in the new coming construction and rehabilitation projects, and there is a proposal to use HDPE pipelines (for diameters $\leq$ 100 mm) in the new network projects.

A plan of replacement/reinforcement/extension is set for the short, middle and long terms (JWU *et al.*, 2015). The plan is based on design standards, past experiences regarding system failures and the projected growth of water demands and water resources. It is

updated annually according to actual developments and the availability of financing resources.

Operation of the system reaches generally a high level despite the fact that water is supplied to the customers with almost continuous service in winter months and on an intermittent supply basis in summer seasons when the demand increase by more than 15%. In the latter case, JWU supplies water in rotation according to a time schedule, generally for two days each week. For the customers, in order to cope with such intermittent supply regime, they secure their water supply through the use of roof or ground tanks which are filled during the time that water is provided at adequate pressures. The demand is met in every locality at a relatively moderate average rate of 103 l/c/d water billed (which is globally lower than average WHO standards with 150 l/c/d). About 27.9% of the total system input volume was estimated by the JWU as water losses in 2015. Water is periodically tested by the JWU, and the quality of water complies with and exceeds WHO standards.

4.10 Wastewater Management

To date, the local government through the municipalities, village councils and local councils is responsible for providing and managing public facilities and services related to the wastewater collection, treatment and disposal and storm water drainage in Jerusalem and Ramallah & Al Bireh Governorates. Exception is the western parts of Jerusalem where Hagihon Company is responsible for such services. Nonetheless, it was decided to hand over direct responsibility for delivering these services and facilities in JWU's jurisdiction to the JWU according to the ministerial decree issued in this regard in 2011.

Clearly, it will be rare for the responsibility for providing sanitation services to fall solely on JWU in a once. This fact brought the stakeholders in the sector to the stepped approach that the integration of wastewater services by JWU must start with the implementation of new wastewater projects in the area in appropriate ways of planning and financing. For this, JWU through focal project management has been identified to take overall responsibility for the planning and implementation process.

The existing situation of the wastewater services in the governorates of Jerusalem and Ramallah & Al Bireh is summarized in the following two paragraphs.

In Jerusalem Governorate, all of the East Jerusalem localities are partially or totally connected to the public sewerage network which serves approximately 85% of housing units, whereas the remaining housing units are connected to cesspits for wastewater collection (ARI, 2014). In the remaining areas of the Governorate, the practices for managing domestic wastewater are limited to the collection of WW by sewer networks and/or cesspits and the disposal of untreated wastewater into open areas, including wadis (valleys) and agricultural lands (ARIJ, 2014). Out of these areas, only 9 communities are served, either fully or partially, by wastewater network with approximately 31% coverage

of the housing units, whilst the rest are connected to cesspits for wastewater collection. The majority of cesspits are unlined meaning that sewage seeps into the earth, avoiding the high costs of emptying cesspits through vacuum tankers (ARIJ, 2014). Figure 4-11 shows part of the network in one of the served areas (AL Ram) which is cut by the segregation wall.

Figure 4-11 Sewage Overflow onto Open Lands due to the Cut of Sewage Network by the Separation Wall in Al Ram (after ARIJ, 2014)

In Ramallah & Al Bireh Governorate, the sewerage systems with treatment facilities do not exist except in the municipalities of Ramallah and Al Bireh and in the municipality of Rammoun-Taybeh. Only very limited number of other localities (five only according to PCBS, 2015) is served by sewage networks, while all other localities in the governorate rely on cesspits/septic tanks and sludge transportation by trucks. Most of the collected wastewater in these localities is disposed in open areas, agricultural areas and wadis (Ramallah Municipality *et al.*, 2010). The situation poses risks of environmental health hazards and pollution of groundwater resources.

The current plans in place are to solve the problems in the most urbanized areas of the Governorate of Ramallah & Al Bireh, in Ramallah, Al Bireh and Betunia cities (the prospected Metropolitan Area), by implementing central treatment system through the construction of new central wastewater treatment plants, the expansion of the existing Al Bireh WWTP, and the upgrade and the expansion of the infrastructure in the cities of

Ramallah and Al Bireh and the building of new networks for the currently unserved city of Betunia and for the neighboring villages which could be connected to the system. The process is geared by funding from the German Government through its KfW Development Bank (the donor) and managed by JWU as the Project Executing Agency as of 2011. The implementation will be in phases. At the moment, JWU have the financial accountability of the project and the responsibility for 27 million Euros funds contributed from the donor for the implementation of a central WWTP in Betunia (Ein Jariot) along with main conduits and collection networks to serve Betunia city, parts of Ramallah-West and some of the neighboring villages, and for the implementation of the accompanying -legal, institutional, technical, financial, and operational- measures and arrangements necessary for the transfer of the wastewater services from the municipalities to the JWU. The new assets will be owned by JWU and the project would form the nucleus for the integration of the sanitation services in the area by JWU in the future.

4.11 JWU Organizational Structure

The JWU organization is headed by a Board of Directors chosen among municipalities and localities supplied by JWU and a representative from the Government. They appoint the General Manager of JWU.

The Board of Directors comprises seven members distributed as follows:

- Two Members from Ramallah Municipality (Mayor and other municipal member).
- Two Members from Al Bireh Municipality (Mayor and other municipal member).
- Mayor of Deir Dibwan Municipality.
- Representative from Kufr Malik Village.
- Representative from the Government.

The Board of Directors is headed alternately between the Mayors of Ramallah and Al-Bireh Municipalities on a yearly basis.

The present organizational structure of JWU is given in Figure 4-12. The structure was adopted in 2012. Technical affairs are covered by two functional departments: the water operations department and the engineering department, and one currently non-functional department: the wastewater operations department.

The number of employees in 2015 is 256. The water operations department and the customers services department assigned the largest number of staff.

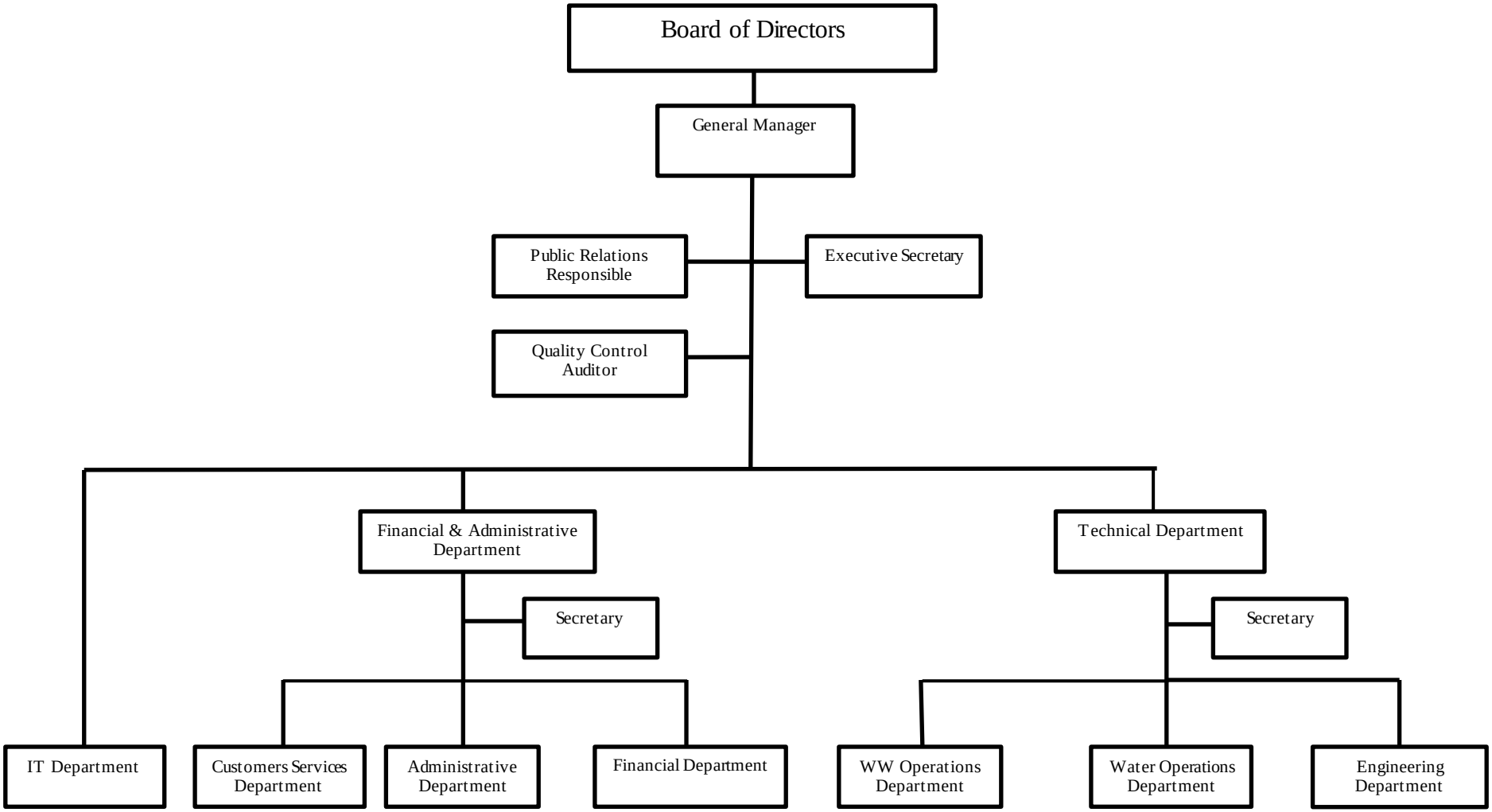

Figure 4-12 JWU Organizational Structure (adapted by the researcher from JWU, 2014)

Chapter 5

Results and Discussion

In this chapter, the reform plan will be prepared in seven steps, each corresponding to the sections in this chapter of the research. The plan will include the following components:

1. Governance and political economy analysis
2. Stakeholders analysis
3. Improved management strategy
4. Financial improvement strategy
5. Sustainable management system plans: asset management, NRW management and whole system integration
6. Reform roll-out timeline (planning stages of change and putting the reform packages together)
7. Communication strategy (selling the reform plan)

5.1 Governance and Political Economy Analysis

This section is the first of seven sections in Chapter Five. This section builds the foundation required for the reform process and captures it in a governance and political economy analysis as the important first step in designing successful utility reform. It will discuss the political challenges of the water sector in Palestine and analyze the overall policy and legal and institutional environment within which JWU utility operates and the reform must take place by mapping out the governance and institutional arrangements and the stakeholders in the sector.

5.1.1 The Political Context of the Water Supply and Sanitation Sector in Palestine – Performance Gaps

By studying the local context of the WSS services, it is found that the water sector in Palestine exhibits the following performance gaps:

- Complicated wider political economy context where sector policy, planning, investment constrained by the political and security situation;
- Shrunk water production capacities (due to the occupation practices and their control over water resources);
- Growing dependence on water purchases where per capita supply is variable with an average use well below international standard of 100 liters per day;
- High access to improved water supply services (piped water supply system) with high connection rate to safe water (in general);
- Low coverage of the water distribution networks in areas where development is restricted or marginalized communities live;
- Drinking water supplied intermittently (only a few days per week), but with good quality;
- Insufficient waste water treatment capacities (with less than 25% treatment);
- Increasing access to improved sanitation although with two thirds of residents flushing their toilets to septic tanks;
- And the majority raw sewage regularly overflowing or discharged into wadis;
- Endangered available water sources polluted by the dumping of waste water in the environment;
- Collection of user charges insufficient to cover O&M, let alone capital costs, leaving WSS service providers unviable and entirely dependent upon operating subsidies and development grants;
- Many WSS service providers (almost 300) with varying size and legal status
- Inefficient WSS service providers with high NRW, energy consumption and staffing ratios and low collection ratios;
- WSS service providers with limited or no autonomy;
- WSS service providers with unclear upward accountability (having three oversight entities of PWA, MoLG and the WSRC with conflicting objectives and confused relationships);
- WSS service providers with limited or no accountability to customers (and absent consultation with the public);
- WSS service providers in financial difficulty or technically bankrupt (lack of skilled staff, and managers with limited empowerment and incentives/motivations, and no business orientation) ;
- Low pace implementation of sector restructuring (including the slow realization of the NWC) complicated with the conflicting visions of the PWA, MoLG, WSRC;
- No well-established subsidy scheme in place with no pro-poor strategy and no incentives to the SPs to perform well; and
- Massive infrastructure needs, with inadequate levels of investments, though the multiplicity of donors working in the sector.

5.1.2 Water Sector Institutional Framework and Overall Governance of the WSS Services

In 2010, the Government entered into a water sector reform process. It was enacted by the new Water Law in 2014. The overall reform included the reorganization of the water sector, restructuring of the institutions within it, revision of strategies and policies, and capacity building. A number of donors, such as the World Bank, Norway, Sweden, and others, shepherded the reform process. The process includes legal, institutional, and technical aspects of reform. It entailed institutional separation of the regulatory function from the PWA to create an independent regulatory agency [watchdog], and led to the enactment of a Water Law in mid-2014 through formal legal process.

The previous sector legislation was established with a bylaw founding the Palestinian Water Authority (PWA) in 1996, a Water Resources Management Strategy (1998), a National Water Plan (2000) and the Water Law (2002). The prior Water Law of 2002 clarified the responsibilities of the PWA as a regulator with the mandate to manage and develop water resources; whereas the supreme decision making body is the National Water Council (NWC), and a wholesaler "bulk water supplier" distributes water to four regional utilities responsible for "retail distribution".

However, that vision (of the prior water law) was not reflected in the organizational arrangements. There was a major difference between the actual set up and the governance structure intended by that Law: (1) the NWC has never functioned as anticipated and has met once; alternatively, (2) the PWA carried out much of the work of drafting national water policy, besides playing the role of a regulator and an implementer at the same time, along with the Project Management Unit (water projects) and the WBWD (bulk water and water projects) reporting to it; and (3) the service provision remains in the hands of the several hundred local government units with one regional utility has been formed in Gaza albeit without structure and financial system in place. All of that has led to a situation of weak governance and capacity in the water sector in Palestine which compounded by restrictions imposed by the occupation, impairing the development of adequate policies and strategies for water resources management, infrastructure development and service provision. The Water Sector Audit Report of 2008 and the World Bank report of 2009 have highlighted that status. As a result, a change in the law or a new water law became forthcoming. By the end of 2009, an "Action Plan for Reform" was endorsed by the Cabinet of Ministers towards the definition and implementation of a comprehensive institutional and legislative reform program in the Palestinian water sector. In 2012, the Ministerial Infrastructure Committee (MIC) approved the principle of the reform plan and the recommendations of the Institutional Water Sector Review (IWSR) and tasked PWA to prepare a new Water Law.

The overall framework of the governance of the water sector set out in the new water law provides for separation between policy making and water resources management, economic regulation, and the service provision. Under the new water law (2014), the PWA is responsible for policy setting and managing all water resources applying principles of integrated and sustainable water resources management; the regulatory function on service provision would be entrusted to an independent Water Sector

Regulatory Council (WSRC) headed by a Chairperson; and the service provision would be carried out by a National Water Company (NWC), Water Users Associations (WUA) and Regional Water Utilities (RWU).

The following Figure 5-1 (a & b) describes the new institutional design for the sector according to the new water law of 2014 and this can be compared to the earlier institutional setup under the previous Water Law 2002.

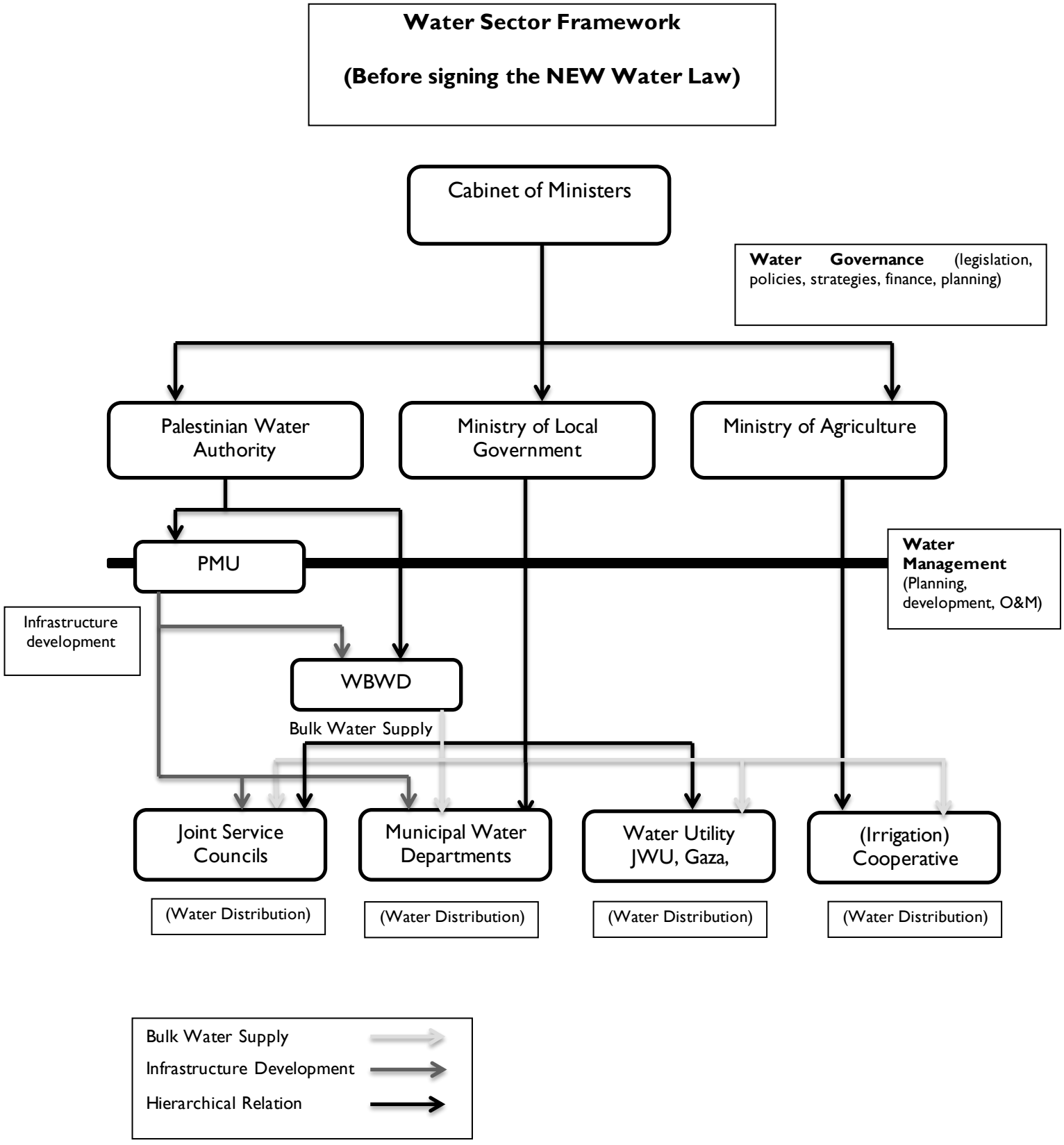

Figure 5-1 (a) Water Sector Framework according to 2002 Water Law (adapted by the researcher after GWP, 2015)

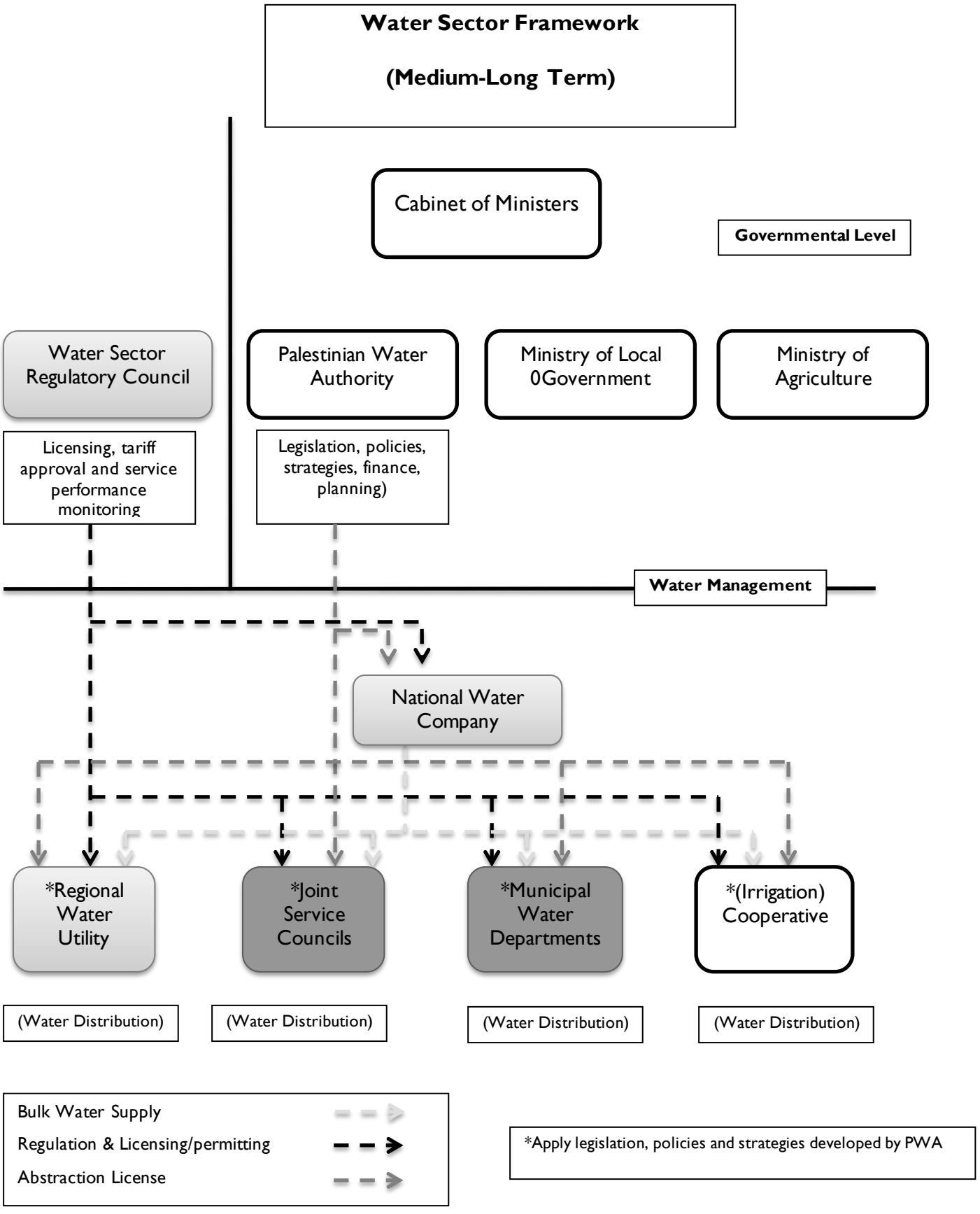

Figure 5-1 (b) Water Sector Framework according to 2014 Water Law (adapted by the researcher after GWP, 2015)

The new water law determines the general structure of the water sector, defines the functions of the institutions governing and managing it, and describes the roles of the different involved Ministries. On above, the law explicitly encourages private sector participation and stipulates that the PWA promotes the participation of the private sector in the sector, in coordination with relevant authorities, by creating the enabling environment and implementing the institutional, regulatory and economic reforms required for this purpose. Table 5-1 maps the roles and responsibilities of the institutions in the water sector "at Central Government level" as per the new Water Law.

Table 5-1 Institutional Mapping of Roles and Responsibilities in the Water Sector at Central Government level according to the New Water Law (adapted by the researcher after GWP, 2015)

a. Allocation of Roles across Ministries and Public Agencies

Area	*Water Resources*	*Water Supply*			*Wastewater Treatment*
		Domestic	*Agriculture*	*Industry*	
Strengthening, priority setting and planning, including infrastructure	PWA	PWA	PWA	PWA	PWA, MOH, EQA
Policy making	PWA	PWA	PWA	PWA	PWA, EQA, MOH
Information, monitoring and evaluation	PWA, EQA (envt condition), MOH (health qlty)	WSRC, EQA, MOH	WSRC, EQA, MOH	WSRC, EQA, MOH	PWA, EQA, WSRC, MOH
Stakeholders engagement, citizen's awareness	PWA, EQA, MOLG, MOH	PWA, MOLG, MOH	PWA, MOA, MOH	PWA, MOH	PWA, EQA, MOH

b. Institutional Mapping for Quality Standards and Regulation

Area	*Water Resources*	*Water Supply*			*Wastewater Treatment*
		Domestic	*Agriculture*	*Industry*	
Allocation of uses	PWA	PWA	PWA	PWA, MOA	PWA
Quality standards	PWA, MOH	PWA, MOH	PWA, MOH, MOA	PWA, MOH	PWA, EQA, MOH, MOA
Compliance of service delivery	WSRC	WSRC	WSRC	WSRC	WSRC
Economic regulation (tariffs) *	WSRC	WSRC	WSRC	WSRC	WSRC
Environmental regulation	PWA, EQA	PWA, EQA	PWA, EQA, MOA	PWA, EQA	PWA, EQA

* According to the researcher's reading of the water law, this function is the responsibility of the WSRC and not the PWA.

From the above, it is clear that the reform process allocates new roles and responsibilities to already existing entities, as well as places a huge burden of new roles and responsibilities on "the often-fledgling institutions". This means that the water sector is currently in a transitional period as structure, mandates and responsibilities are being shifted (GWP, 2015). This is clear in the following (after GWP, 2015) and is explained in Figure 5-2:

- The Palestinian Water Authority (PWA) relinquished its role of regulating service providers and is given to an independent entity "the Water Sector Regulatory Council (WSRC)". The WSRC has been newly established in late 2014;

- The West Bank Water Department (WBWD) will initially undergo a transitional period of financial and management upgrade to be followed by the establishment of "the National Water Company (NWC)" which will be a publically owned water company;

- The individual municipal water departments and the small service providers will initially consolidate into Joint Services Councils and eventually aggregate in the form of regional water utilities (RWU); ideally four regional utilities; Northern, Central, Southern and the fourth is Coastal in Gaza. The Coastal Municipal Water Utility (CMWU) is the model in Gaza however its structure needs to be completed. In the West Bank, Jerusalem Water Undertaking (JWU) will service the middle, Hebron and the Water Supply and Sewage Authority (WSSA) utilities are the model in south, while the transitional model in the North is to replicate the Joint Services Council (JSC) formed by six villages near Jenin. The PWA and the Ministry of Local Government (MoLG) will coordinate to support this consolidation. The Municipal Development Lending Fund (MDLF) can assist in the process;

- As for irrigation water, the Water Users Associations (WUA) is the model for providing the services. It will be established according to a regulation that will be proposed jointly between the Ministry of Agriculture (MoA) and the PWA.

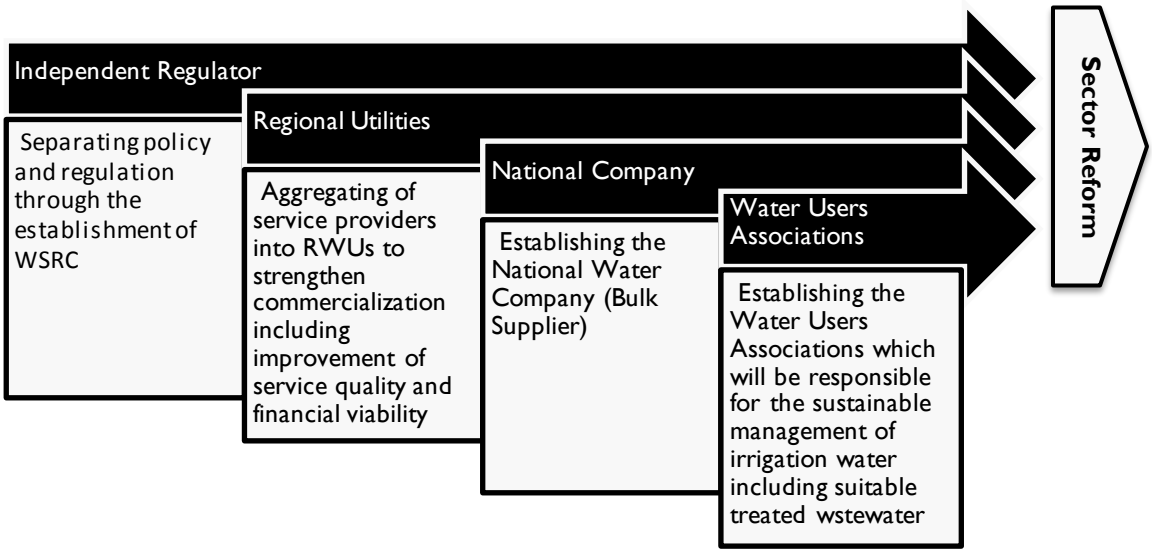

Figure 5-2 The Important Steps for the Institutional Sector Reform

Effective transition plans and appropriate support for capacity-building are critical factors to ensure the sustainable introduction and scaling up of such reforms. This also means that a number of regulations need to be issued for establishing the entities called for in the Law namely the utilities, the new bulk supply company, users' association, and the PPP bylaw. The financing mechanisms are essential tools in providing incentives and support for key sector reforms to ensure long-term sustainability of investments and improve efficiency of resource utilization.

At last, it has to be kept in mind that the political economy context in Palestine plays a major role in shaping the incentives and the constraints for reform and in decelerating the development process.

5.1.3 Governance of Service Providers: Diagnostic and Reform

Of specific focus in this study is the reform of the WSS service provision. The broad principles of the sector reform plan (2014-2016) together outline the institutional reform agenda connected with changing the concept of "what constitutes a service provider in the sector", as the responsibility of service provision shifts from a wide range of organizations of different types and forms, most of which are "lower tiers of government", to regional utilities. The key aspect here is the separation of functions related to (a) the policy role of the upper tiers of government, (b) an independent regulatory framework, and (c) the service delivery through regional utilities with a business-like approach, along with the water users association (for the agricultural water

use) and the NWC (for the bulk supply). In the new water law, the broad reform agenda were backed through appropriate legal mandates for institutions that define both their powers and responsibilities, in addition to ensuring the right balance between the appropriate regulation and the autonomy of the service providers. For the service providers, their boards of directors, management team and staff shall be selected and operated according to a specific regulation issued by the Cabinet of Ministers.

Among the options that were agreed for restructuring the WSS sector and service delivery and investigated as part of the reform process includes aggregating operations and combining drinking water production and distribution and wastewater collection and disposal operation.

At present, service provision is split amongst nearly 280s water and wastewater SPs with varying size and legal status (WSRC, 2017). There are 3 utilities; 101 municipal water departments; 162 village councils; 13 Joint Service Councils and one NGO (PWA, 2017). They operate under different financial, administrative, institutional, and operational conditions, in addition to differences in availability and types of water resources, area of operation, average pumping head, availability and status of infrastructure, financial resources ... etc (WSRC, 2016). The nature and number of these SPs are such that they have grown over the years on their own without planning.

As a result, a number of problems have arisen. The loss of scale economies is the first of these. Aside from technological economies, the scarce human resources and the technical capacity are diluted across a large number of SPs. On above, the commercial viability of many of the small service providers is questionable, as many of them serve rural or low-income communities, thereby suffering from difficulties in obtaining financing from donors or attracting private sector investment. In addition, many are subject to interference by local government with weak accountability and low incentives to perform well.

To counter these problems, the Government adopted a new institutional architecture with a certain degree of “centralization” which deemed necessary for proper management of service provision in light of water scarcity and the uneven distribution of resources.

In that way, restructuring is moving in the direction of regional monopoly for WSS, with “four regional utilities” grouping the present SPs together institutionally and physically (via bulk connections). The Implementation would be phased with progressive aggregation as exemplified in Figure 5-3. The aggregation process should include an intermediate phase, but harmonization should not be put off too long. The Joint Service Councils (JSC) as a more decentralized model has been gaining acceptability and can be the vehicle for common action on WSS for smaller villages and towns in the short term (World Bank, 2009). The new aggregated organizations would be autonomous and financially self-sustaining, and owned by the participating local authorities. They would operate under the mandate of PWA/WSRC.

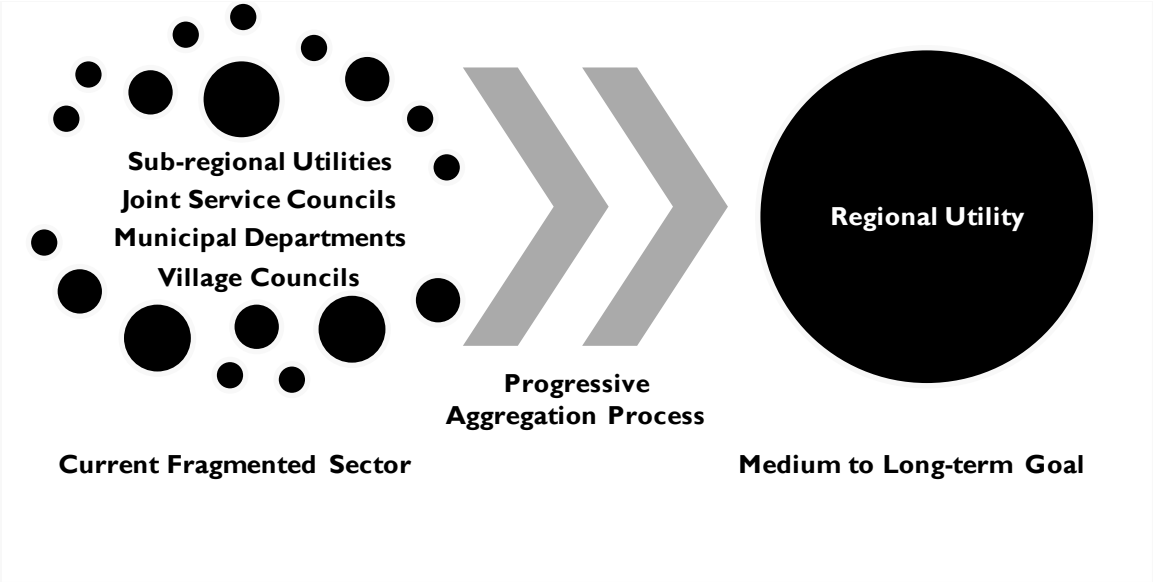

Figure 5-3 Schematic of the Aggregation of SPs toward Regional Monopoly (developed by the researcher)

A governance benefit of aggregated provision (into the regional utilities) can raise the efficiency of service delivery through "economies of scale and scope". Gains may come from decreasing costs through bulk purchases, among other sources, and sharing overhead costs across a broader customer base, besides the ability to conserve scarce human resources such as planners, managers, and skilled technicians, concentrating them in a "single" entity. On the other hand, political interference is less likely when oversight is pooled in an aggregated entity, at the expense of "diffused accountability". As a final note, the decision to aggregate makes technical, economic, and political sense on its own, but it also serves as a secondary purpose of attracting private operators.

This trend toward aggregation of authority is creating opportunities and challenges for the sector. Diagnosis of factors favoring the aggregation of SPs is presented here-under:

First, the restructuring of the WSS service provision is undertaken as an integral part of the wider reform process of the sector including regulatory reform, rather than as part of a "general thrust" toward aggregation.

Second, the decentralization of the sector was made to the "regional" rather than the "municipal level"; with the formation of 4 utilities. Most of which would grow out of the "pre-existing" undertaking and semi-utilities of the [former] sub-regional monopolies.

Third, the restructuring is going on in parallelism with continued efforts to corporatize and consolidate the SPs in order to raise the efficiency of WSS service delivery. Examples are the progress which has been made with bringing some WSS services and service providers into "clusters" under "Joint Service Councils" in the north (Jenin) and south (Hebron), and the current efforts by donor financing to support the municipal water

departments of Hebron and Nablus in becoming a municipal utility and ring-fenced independent municipal entity respectively.

Forth, the synchronicity between structural and regulatory reform was fortunate. However, the creation of the independent WSRC preceded notable market consolidation. This denoted that regulatory reform had to be overlaid on a sector structure that is far from "optimal" from economic point of view. So even in the absence of resistance to aggregation, the "sheer fragmentation" of the [quasi-] decentralized service provision is capable to paralyze the efforts of the "central regulator".

In conclusion, aggregation of WSS service is on the rise in the sector. Nonetheless, it is relatively slow, even that the implementation was left to the regions. The key features of each region will have particular issues in the aggregation process. The JWU and to a lesser extent the Bethlehem WSSA utilities, provide "the nucleus" for regional utilities in their areas, the CWMU is in Gaza, the JSC formed by six villages near Jenin constitutes a transitional model which needs to be replicated in the north. The amalgamation of smaller municipalities through common projects with one providing leadership [and resources] is necessary to move forward. As mandatory action may appear as heavy-handed interference in local matters, incentives may be preferable. The policies of the MOLG can be converted into projects that amalgamate smaller municipalities together. The WSRC can also assist by gathering the data and compiling it in a merged system, and evaluate the extent that "amalgamation" can achieve. Aggregation may also be a precondition for investments by the aggregated entity in shared facilities. The new aggregated entities should be connected to the wider planning and investment procedures and needs. Responsibility for infrastructure development should be vested with corporatized entities that own and maintain WSS assets and are responsible for servicing the debt attached to the financing of their extension.

5.1.4 Jerusalem Water Undertaking: Towards Central Utility and Regional Water and Sanitation Service Provider

This section examines issues linked to the aggregation of WSS services and the grouping of the several municipalities and the small and medium-sized towns and villages within the central area into JWU.

The JWU utility reform fits well with the other changes transforming the WSS sector. A wider aggregation of local services is underway within a clear legal framework creating a regional utility model. JWU is in the middle of the process, and the aggregation of the WSS services into JWU within the central area should be coordinated with the wide reform process. The interlock of the sector reform and utility reform processes is represented in Figure 5-4.

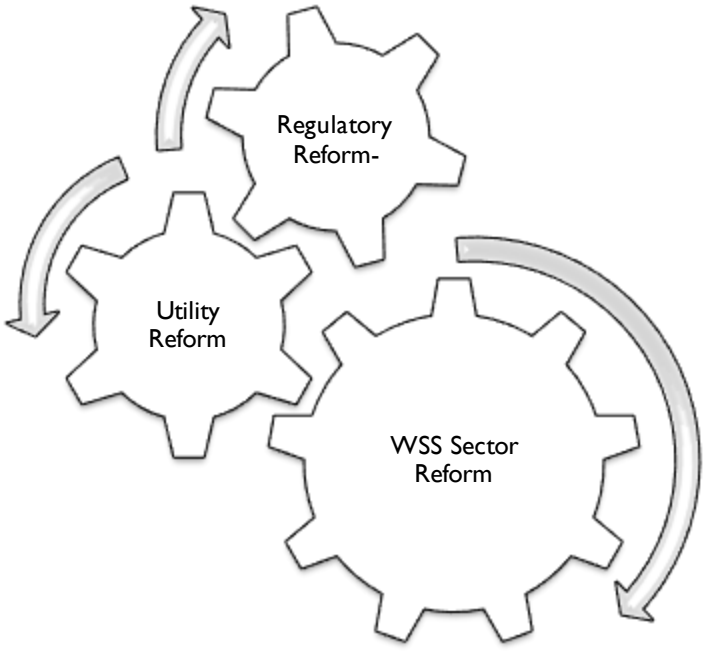

Figure 5-4 Utility Reform - Sector Reform Interlock

Economies of scale for improving the efficiency of operations of the WSS services was a primary driver for the aggregation process. The policy makers were having interest in the extent of these economies (Figure 5-5). They have assessed the optimal scale of the market for service provision and also opened the sector to private participation. In this case it is regional grouping, in the north, middle, south, and coastal.

Aggregated structures can vary widely, revolving around three dimensions according to the (World Bank, 2005) as described below:

- **Scale:** "Aggregated structures can group two neighboring municipalities or several municipalities in a single region or across a broader territory".
- **Scope:** "Aggregated structures can provide a single service (for example, bulk water supply) or all services, from raw water abstraction to sewerage treatment. For each of these services, they may carry out certain functions only (such as procurement) or be responsible for all functions, from operations and maintenance to investment and financing".
- **Process:** "Municipalities may form aggregated structures voluntarily based on mutual interests, or, alternatively, a higher level of government, driven by the overall public interest, may impose or incentivize the aggregation process. The aggregation may be temporary (for a short-term specific purpose) or permanent".

Figure 5-6 describes where JWU stands now and to where it will go with respect to these three dimensions.

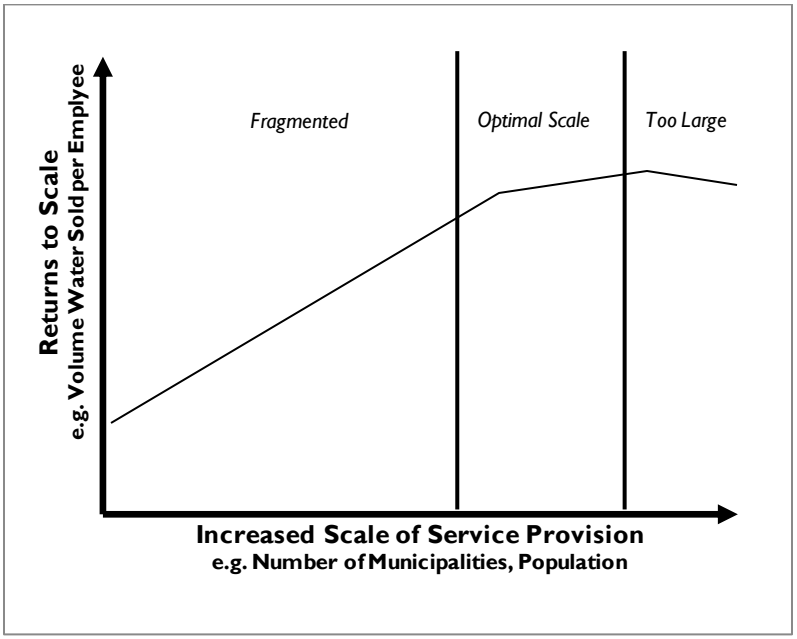

Figure 5-5 Returns on Scale and Scale of Service Provision (after World Bank, 2005)

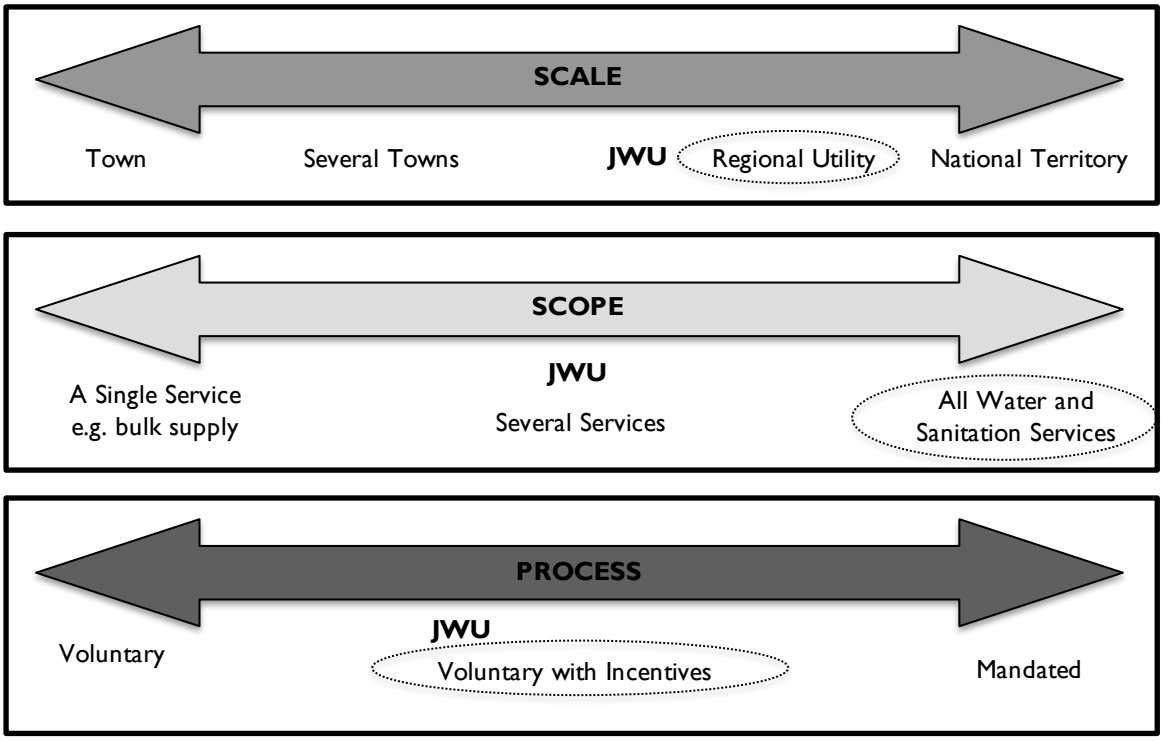

Figure 5-6 Dimensions of Aggregation Reform of JWU – the texted 'JWU' means "where JWU currently stands", dotted circle means "where JWU would be" (adapted by the researcher based on World Bank, 2005)

Building on the broad experience with the aggregation processes worldwide, the (World Bank, 2005) described "general steps that frames initial recommendations as to what an appropriate process for aggregation could consist of". They are presented in Figure 5-7. However the process on ground depends on the following factors: the initial situation, the model chosen for aggregation, the responsibilities' allocation amongst levels of government, and other political, cultural, social, and legal factors (World Bank, 2005). For JWU to expand geographically to a regional scale and to integrate the sanitation services within its mandate, this recipe of recommendations applies to the case of JWU as well. In this context, it is noteworthy to mention that JWU has somehow past experience with aggregations in terms of scale. The last experience was in 2014 when Birzeit Municipality joined JWU. The historical rates of joining of LGUs in Jerusalem and Ramallah & Al Bireh Governorates to JWU are presented in Figure 5-8. In parallel, Figure 5-9 depicts the rate of increase of JWU's annual subscriptions.

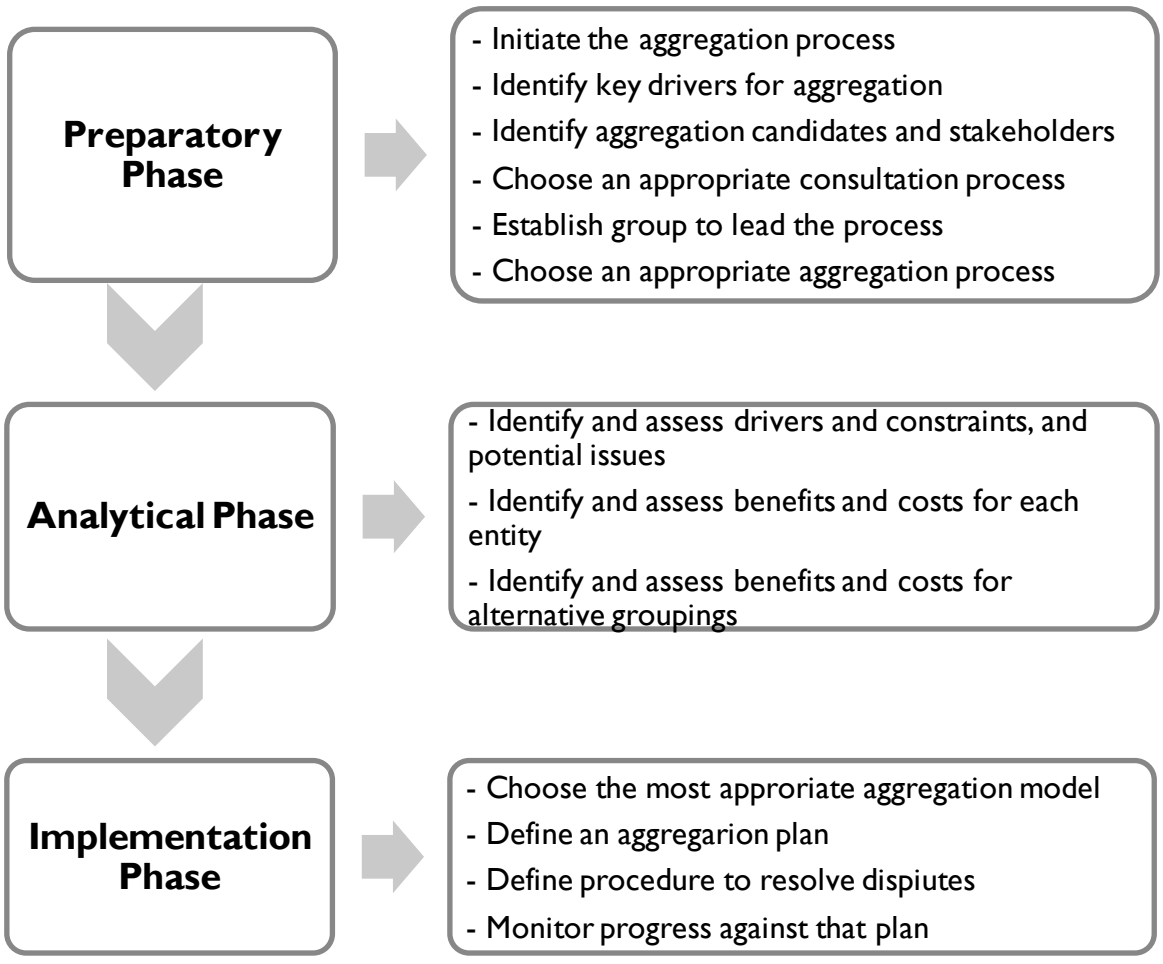

Figure 5-7 Steps in Aggregation Process (adapted by the researcher after World Bank, 2005)

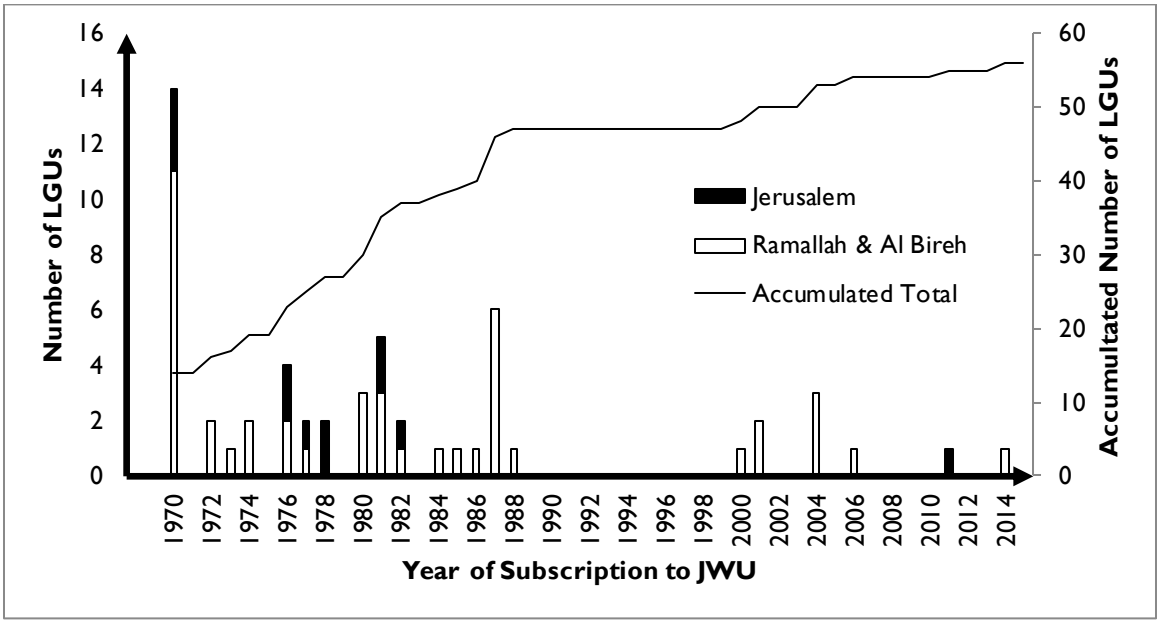

Figure 5-8 Rate of Joining of LGUS in Jerusalem and Ramallah & Al Bireh Governorates to JWU (developed by the researcher)

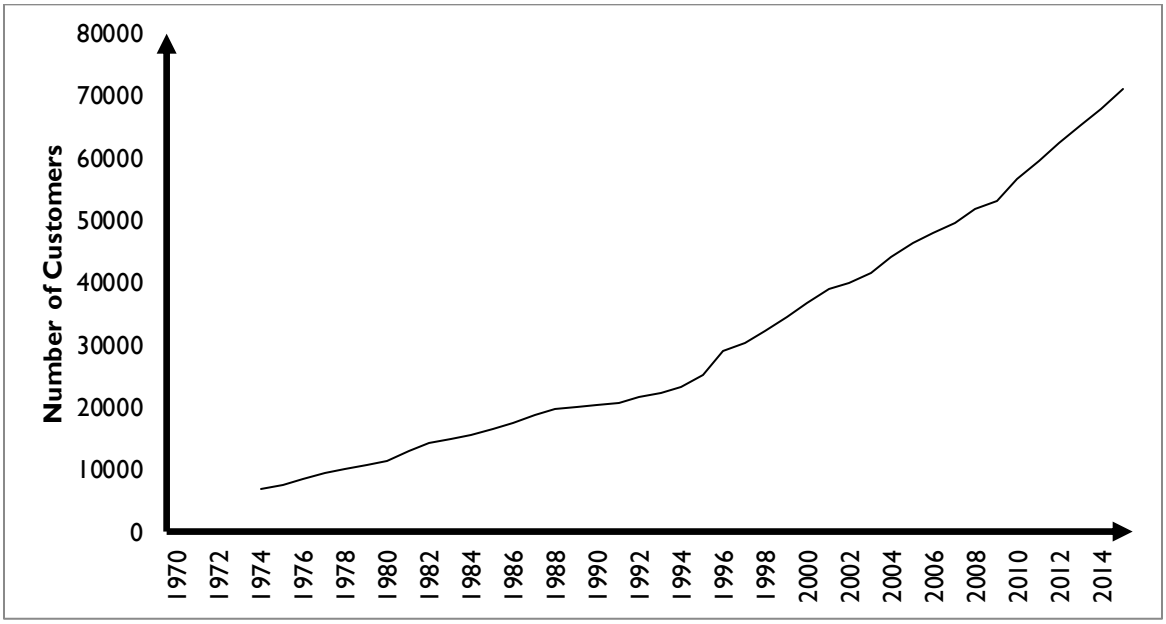

Figure 5-9 Rate of JWU's Annual Subscriptions (Total Number of Active and Inactive Customers) (developed by the researcher)

5.2 Stakeholder Analysis

This section is the second of seven sections in Chapter Five. Section one provided the foundation for the study by assessing the Palestinian WSS sector/utility governance and analyzing the political context in which JWU utility operate.

Having defined the political backdrop of the reform process, the aim of this section is to look at the key stakeholders who operate within this political context and to identify their needs and concerns, and potential conflicts of interest between them.

5.2.1 Stakeholders Identification

The key stakeholders who are most relevant to JWU and will also be relevant to consider in relation to the reform process are:

5.2.1.1 Palestinian Water Authority

The Palestinian Water Authority (PWA) is the Water Sector leading institution in Palestine. According to the law, it is responsible for setting the national water policies, strategies and plans as well as the development of plans and programs for capacity building, training and qualification of technical staff working in the water sector and supervising their implementation. It is also responsible for managing all water resources in Palestine applying principles of integrated and sustainable management of water resources (Water Law, 2014). This includes surveying the available water resources, proposing water allocations for various sectors and their utilization priorities, and licensing and development of water resources utilization. It is mandated for taking measures and development plans for the development of the NWC, RWUs in coordination with the relevant authorities including proposing draft laws and draft regulations related to water, and submitting them to the competent authorities for their duly issuance. Thereby, PWA has the responsibility to decline institutional reform projects and programmes that are inconsistent with the goals and objectives of the legislated WSS reform plan.

5.2.1.2 Water Sector Regulatory Council

The Water Sector Regulatory Council (WSRC) was established in late 2014 by a decision of the Cabinet of Ministers and is regulated pursuant to the new water law 2014. The WSRC is introduced to insulate the service providers (including the regional utilities) from political interference. It will require that the utilities business be conducted along the lines of sound financial and operational principles. The mandate of the WSRC includes (1) approving tariffs at a level that allows the SPs to recover the efficient costs of operation as well as a reasonable rate of return at affordable prices and in compliance with the policy adopted by the PWA while at the same time (2) monitoring the achievement of the targets of coverage, quality, and efficiency.

5.2.1.3 West Bank Water Department

The West Bank Water Department (WBWD) is running as bulk supplier since 1967. It is responsible for bulk water supply and sale to water service providers in all governorates. The responsibilities include the extraction of water from water resources, desalination of water, and bulk water transmission. Under the implementation of sector reform plan, its powers, responsibilities, and all rights and obligations, as well as movable and immovable assets will be transferred to the anticipated National Water Company (NWC). The NWC will be fully owned by the Government.

5.2.1.4 Financiers (Donors)

Donors are vital stakeholders in Palestine as the WSS sector is highly dependent on foreign aid. The power donor governments and bilateral and multi-lateral donor agencies hold can have significant effects. Obviously, donor policies and partnerships influence processes of good governance, representation and accountability. In 2012, the PWA and most of the development partners involved in the WSS sector have signed a Memorandum of Understanding (MOU) for the alignment and harmonization of strategies in support of the PWA's WSS Sector Reform Plan and for the support of the National Sector Strategy for WSS. The MOU translates OECD-DAC global aid principles of ownership, alignment, effectiveness, managing for results and mutual accountability into a Palestinian Context with a perspective of a sector-wide approach to development and reform of the Palestinian WSS sector.

Donors who are active in the WSS sector are Germany, World Bank, Austria, France, Sweden, Office of the European Union Representative (EUREP), Finland, Japan, United Nations Children's Fund (UNICEF), the Netherlands, and United States Agency for International Development (USAID). To obtain donor funding, the Palestinian Authority periodically develops a three-year plan that outlines the sector's development needs. This plan is then submitted to different donors. Coordination of donor assistance is in place to prevent duplication and to ensure alignment in relation to the sector's national strategies and plans.

The Financial Cooperation of the German Government (BMZ) through KfW and GIZ (previously GTZ) provides considerable financial and technical assistance to the JWU since 1996 with the aim to build the capacity of JWU and expand its mandate as the future central water utility. The financial cooperation programs focuses on consolidating water and sanitation services in the existing JWU's domain. For more than decade, KfW Development Bank (KfW) is the lead international partner with JWU.

5.2.1.5 Customers

The customers are under direct contract with the service providers (operators). The same applies for JWU. Consumers constitute a fairly heterogeneous category including a majority of already connected high, middle (most) and low income households and the other households relying primarily on expensive substitutes.

5.2.1.6 Ministry of Local Government

The MoLG is the main source of local communities' sector data. It is responsible on the physical planning for the expansion of the built up areas. MoLG by its law is the governmental body responsible in providing the municipalities and village councils with financial and administrative assistance (Ramallah Municipality *et al.*, 2010). According to the strategic plan of the MoLG (2010 – 2014), the ministry has the following goals: (1) Empowering the LGU's ability to build effective institutional capacities, (2) Promoting the MoLG's capacities in planning, as well as guidance and monitoring to better lead the local government sector, (3) Promoting democracy, transparency and community participation in the local government sector, and (4) Promoting the concept of partnership between LGU's and the private and public sectors, in order to generate local development and to enhance the fiscal autonomy for the LGU's. Law no. 1/1997 is the law that governs the Palestinian Local Government Units (LGUs). It authorizes the LGUs with 27 roles including the provision of WSS services within their jurisdictions.

5.2.1.7 Municipalities

In this study, the main municipalities that would make part of the discussion are the municipalities of Ramallah and Al Bireh and the municipality of Betunia. Ramallah and Al Bireh municipalities share many characteristics in common. Both municipalities are served by water supply by JWU but each is an independent operator and developer of wastewater services. Betunia Municipality is responsible for providing water supply services within its administrative area and is only supplied by water in bulk by JWU. The city has no piped sewer system yet. All of the three municipalities are important stakeholders in the recent discussions for the integration of their WSS services by JWU which were triggered by the new sewerage projects planned for these cities. In principle, all of them agreed on the transfer of their WSS services to JWU. It is a reciprocal agreement. Together among other stakeholders, in 2011, they have signed a Minutes of Meeting (MoM) including an action plan for the implementation of a regional sewerage project in Betunia and Ramallah. And in 2017 Ramallah and Al Bireh municipalities have also signed another Memorandum of Understanding (MoU) with the BoD and the same donor for the expansion of Al Bireh WWTP and the transfer of Al Bireh WW services to JWU. KfW Development Bank (KfW) is the donor stakeholder in both projects and JWU is the Project Executing Agency (PEA) in the first project and supposed to be the implementer in the second project of Al Bireh WWTP as well.

5.2.1.8 Labor Union

The labor union of JWU is in operation since 1993, the year of its official registration in the Ministry of Labor (MOL). The predecessor of the union was established in late 1980s as the Labor Committee. The union has its own regulation (rules) and is working to unify staff to campaign the utility management for better conditions for workers in the utility. According to the latest amendments of the union rules, the membership of the utility employees (workers) is optional. The annual membership fee is in the order of 24 Jordanian Dinars. The union is led by seven elected members including the chairman. The elections are made every 2 years. In 2014, the union joined the General Federation of Independent Trade Unions - Palestine.

5.2.2 Mapping Stakeholders

Figure 5-10 maps the stakeholders visually, showing the relationships between each. It is also known as the accountability framework within which key stakeholders operate. The accountability framework is defined as the set of: (i) mandates of the various actors; (ii) contractual arrangements that define relations between actors, and (iii) instruments used by actors to implement their mandates. The JWU, being the core research focus, is put in the central position of this governance map.

The map reflects fairly unbundled accountability framework of WSS sector with respect to JWU where the key functions of: (i) policy formulation; (ii) regulation of service; (iii) provision of the service and asset management and infrastructure development; and (iv) financing of the service are separated.

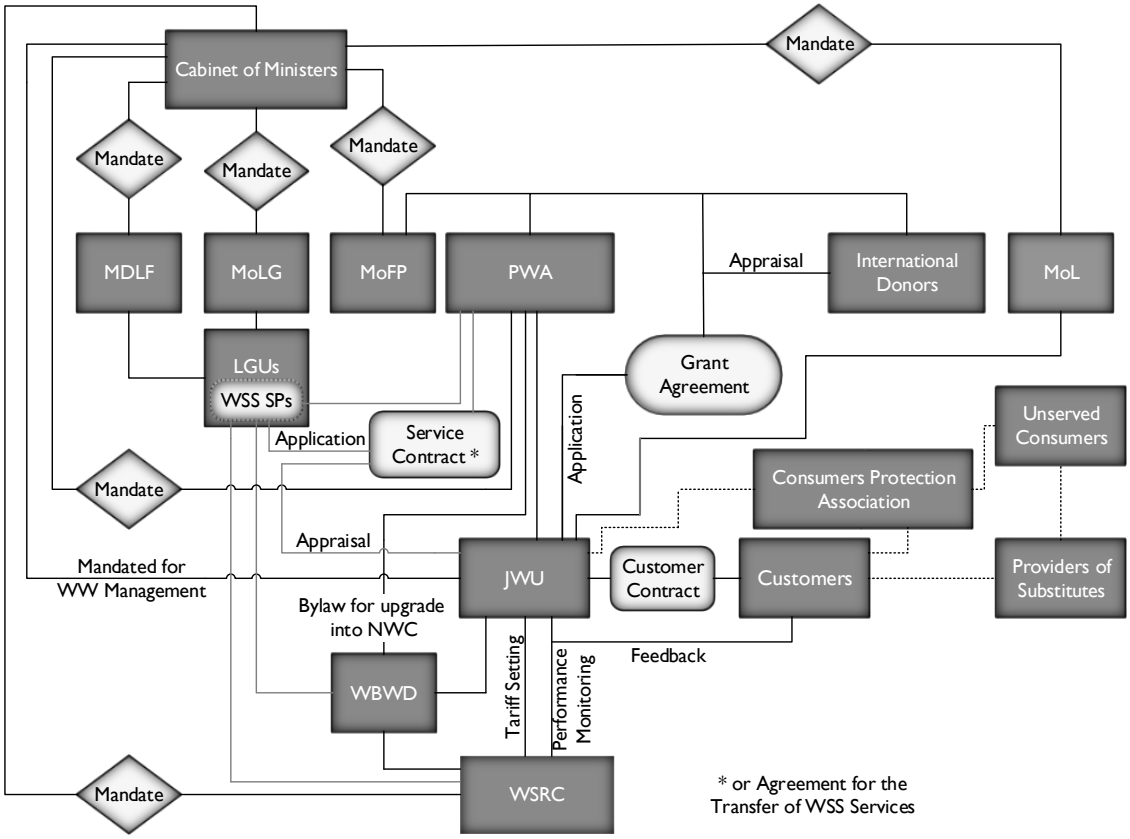

Figure 5-10 Map of JWU's Key Stakeholders and its Accountability Framework (developed by the researcher)

Table 5-2 also describes the mandate of each key entity in the sector, the contractual arrangement between the various actors, and the procedures and key instruments under which they operate.

Table 5-2 Actors, Mandates, Contracts and Instruments (developed by the researcher)

Area	*Mandates*	*Contracts*	*Instruments*
PWA (Central WSS Authority)	• Setting WSS policies • Allocating water entitlements • [Providing /securing] grant financing • [providing] targeted subsidies • Development and licensing of Water Resources utilization • Monitoring water quantity and quality • Developing capacity building and training programs • Monitoring trading of water entitlements	• Water entitlements • Delegation agreement	• Appraisal of grant financing applications • Water abstraction and quality monitoring • Aquifer models • Economic and financial models • Dispute resolution mechanisms
WSRC (Regulatory Body)	• Approving customer tariffs • Monitoring WSS operations efficiency • Issuing licenses to WSS SPs and operators • Addressing complaints of consumers against SPs. • Establishing of a database for financial, technical and statistical information		• Technical audits of reporting by SPs • Customer surveys • Economic and financial models • Dispute resolution mechanisms
WBWD (Bulk Supplier)	• Supplying and sale of bulk water to SPs. • Allocating water entitlements • Setting and collecting bulk water tariffs	• Water entitlements	• Water abstraction & transmission, water quality monitoring • Dispute resolution mechanisms • Economic and financial models
JWU (Regional Utility)	• Providing WSS service • Managing and developing WSS infrastructure • Operating and maintaining WSS assets • Meter reading, billing and collection • Setting tariffs and water prices • Interacting with customers	• Customer contracts • Water entitlements • PPPs contract	• Infrastructure development plans, financing applications, demand assessments • Design, procurement, implementation supervision • Commercial & technical operating manuals • Operating financial statements • Asset management plans • Dispute resolution mechanisms • Audits of private operator's activities • Reporting to regulator
Customers	• Paying for WSS service	• Customer contracts	• Dispute resolution mechanisms • Customer surveys
Financiers	• Providing grant (and debt)	• Financing	• Appraisal of financing

Area	*Mandates*	*Contracts*	*Instruments*
	financing for WSS infrastructure projects	agreements	applications • Control of compliance with conditionality
WUA (Water Users Associations)	• Managing the service of supplying irrigation water • Paying for bulk water abstraction	• Water entitlements	• Dispute resolution mechanisms • Trading water entitlements
Small Scale Service Providers (Informal)	• No official mandate • Catering for consumers who are not served by the official WSS service provider	• Informal agreements with served customers • No official contracts	• Operation of the service • Pre-financing of equipment and infrastructure • Full recovery of capital and O&M costs from user charges

5.2.3 Evaluating Stakeholders

The previous governance map and accountability framework visualize how each actor exercises power in the sector and how the stakeholders might influence the reform process through various actions. It should be recognized that stakeholders:

- hold different levels of power and influence,
- have different vested interests,
- have access to different resources,
- have different sources and amounts of information about the sector, and
- will likely show different levels of support for change.

Accordingly, each of the key stakeholders is to be assessed in four key evaluation areas. Commentaries on the key areas of evaluation are presented in table 5-3.

Table 5-3 Areas of Evaluation (after World Bank, 2005)

Area of Evaluation	*Commentary*
Power	Each stakeholder's level of power depends on how they can potentially weaken the political support or authority for decision-makers or their organization; how they can potentially influence or support other people or institutions to oppose the reform; and how they can potentially help strengthen the reform leaders' authority. Stakeholders with a large degree potential influence in each of these ways have a high level of power. Other stakeholders may have a medium or low level of power and influence.
Vested Interests and Financial Benefits	Stakeholders are all likely to have some financial involvement in the WSS sector, which may change after reforms. There may also be other benefits that they currently receive from the sector, which may be threatened by reform. To understand how these changes may influence their levels of support for reform. It is helpful to identify if each stakeholder will face increased or decreased costs, and increased or decreased benefits, as a result of reforms.
Resources	Each stakeholder's level of resources depends on their financial or material resources, control over or access to important or vital information channels, and status or social position. In addition to level of resources, mobility of resources is also important. Resources that can be mobilized rapidly are advantageous if the issue is urgent.
Level and Channels of Information	Looking at what stakeholders know about current utility performance and how reforms could improve this performance, it is important to consider: who is informed?, who needs more information?, who has the wrong information?, how did they get this information?, how would they react after receiving more information?. Based on answers to these questions, it is decided what information each stakeholder needs to be provided with, and how this should be provided.

The results of the evaluation of the stakeholders are presented in table 5-4. In this evaluation matrix, each row represents one key stakeholder group from the governance map and each column represents one of the key areas of evaluation. Three levels (large, medium or small) are used in the assessment of power and influence. Similarly, the expected costs and benefits are assessed using these levels but in combination with the description of either increase or decrease. The remaining areas are filled by the researcher using her assessment lens.

Table 5-4 Stakeholders Analysis (developed by the researcher)

Stakeholder Group	*Level of Power & Influence*	*Expected Change in Costs through Reform*	*Expected Change in Benefits through Reform*	*Resources Available*	*Information Required / Level of Information*
PWA	Large	Large, Increase	Large, Increase	Financing, Subsidies, water entitlements	Financing, subsidies, new investments
WSRC	Medium	Small, Decrease	Large, Increase	Incentives	SPs performance, tariffs
MoLG	Medium	Small, Increase	Small, Decrease	Subsidies	Subsidies
Municipalities (or SPs) to be aggregated	Large	Small, Increase	Medium, Decrease	Assets, water/ or WW connections, [Staff]	Own operational & Financial performance, amount of shares
JWU BOD	Large	Small, Increase	Large, Increase	Know-how, staff, [economies of scale]	SPs operational & Financial performance incl. assets value & debts, water resources, financing, subsidies,
WBWD	Small	Small, Decrease	Large, Increase	Water entitlements	Water resources
Financiers (Donors)	Large	Small, Decrease	Large, Increase	Financing	Sector policies, strategies, laws and regulations, service standards, SP operational & financial performances
Customers	Small	Large, Increase	Large, Increase	Financing	Prices, service standards
Labor Union	Large	Small, Decrease	Small, Increase	Labor Voice	Staff issues (salaries, incentives, penalties/rewards, structure …)

Graphical representation of the results of the analysis is also shown in the subsequent diagrams. In the graphs, other stakeholder groups are identified and sited, like the NGOs, media and utility staff, as they may also have certain degree of influence, power, interest, and information in favor or against the reform.

The Figure 5-11 graphically compares the stakeholders by assessing their level of information against their level of support. It can be deducted that the stakeholders that hold more information and show more support for reform may face opposition from the other stakeholders who have less information about sector issues and who are less supportive of reform.

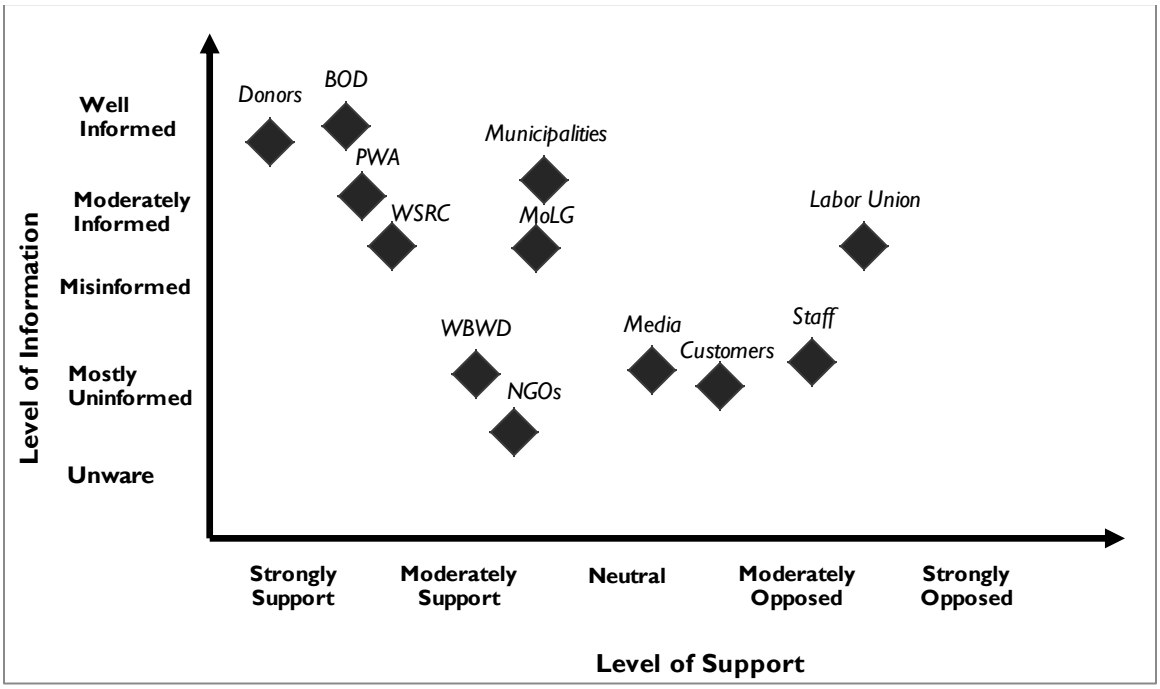

Figure 5-11 Levels of Information and Support of Stakeholders Evaluation (developed by the researcher)

From the above analysis and illustrations, the overall sector climate can be assessed as supporting for reform. The overall support for reform is well present as the momentum for change across stakeholders outweighs the costs of reforms. This is exemplified in Figure 5-12.

5.2.4 Prioritizing Stakeholders

Based on the evaluation of stakeholder power, interests, resources and information, the stakeholders are prioritized using the below grid, plotted as Figure 5-13, by identifying where each stakeholder would fit in it.

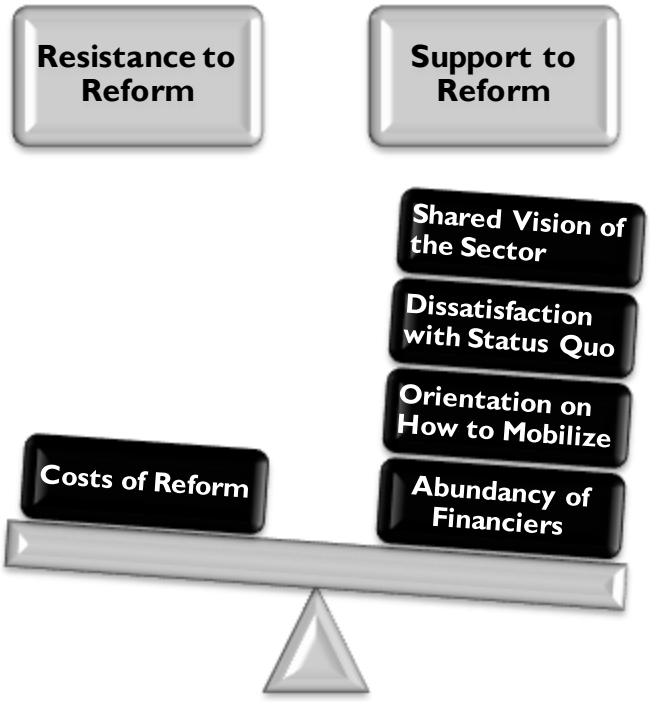

Figure 5-12 Overall 'Sector Climate' towards Reform

The position of each stakeholder in the grid suggests the actions that reformer might need to take to that stakeholder:

- **High power and highly interested stakeholders**: these are the stakeholders that the reformers must fully engage with, and make the greatest efforts to satisfy.
- **High power but less interested stakeholders**: reformers should put enough work in with these stakeholders to keep them satisfied, but not much that they lose interest.
- **Low power but highly interested stakeholders**: reformers should keep these stakeholders sufficiently informed, and talk to them regularly to make sure that no major issues arise.
- **Low power and less interested stakeholders**: reformers should monitor these stakeholders, but not over-feed them with excessive information/communication.

The stakeholders in each quadrant of the grid are also further categorized by their level of support/opposition for reforms using color coding showing: in black the supporters and advocates, in light grey the critics and blockers, and in dark grey the others who are neutrals. The final arrangement of the four key groups of stakeholders is noted down in Figure 5-14.

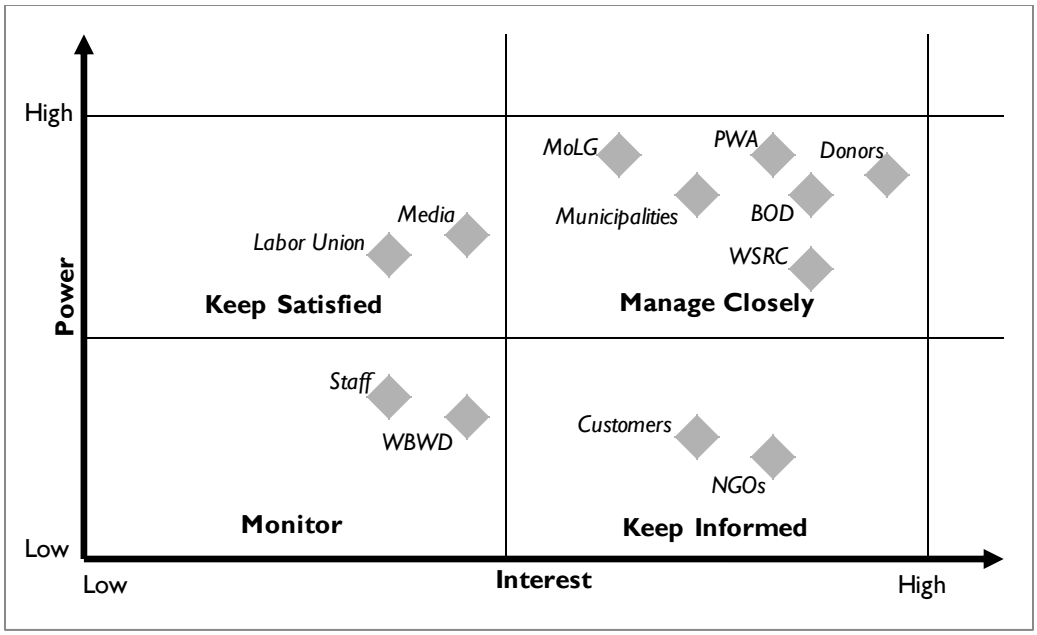

Figure 5-13 Prioritization of Stakeholders (developed by the researcher)

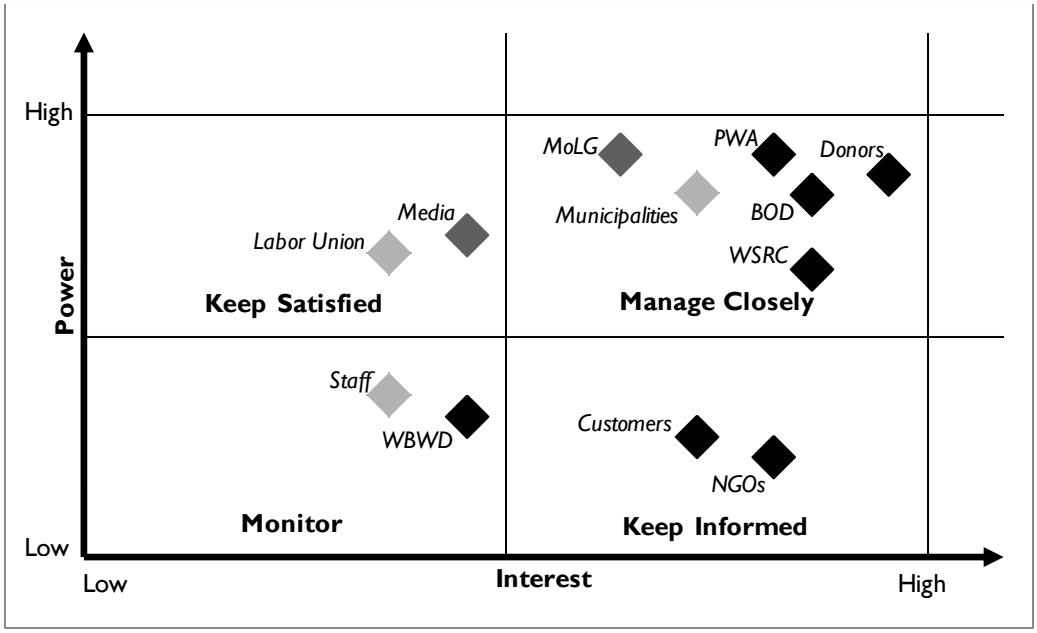

Figure 5-14 Categorization of Stakeholders into Supporters (black), Neutrals (dark grey), Blockers (light grey), (developed by the researcher)

5.3 Good Organizational Management: Running a "Modern Utility" Activities

This section is the third of seven sections in Chapter Five. Section one provided the foundation for the study by assessing the Palestinian WSS sector/utility governance and analyzing the political context in which JWU utility operate. Section Two presented an identification of the stakeholders and their analysis in view of the JWU utility reform.

This section focuses on how to run JWU as a successful utility by employing good management practices for ensuring services are efficient and meet consumer needs. It mainly draws on good utility management theory introduced in chapter 2 which outlines the key characteristics of well-performing utilities. The JWU will be assessed versus these characteristics identifying areas of weaknesses that need to be addressed with a vision towards which reforms can be targeted.

5.3.1 Introduction and General Description

JWU is a multi-municipal [corporatized] water utility established in 1966 that operates under the Regulating Drinking Water Affairs Law in Jerusalem Governorate No. (9). JWU which also owns the assets, supplies potable water to 55 communities. Water is also provided in bulk to 1 community (Betunia). At present, JWU does not operate wastewater collection and treatment but this undertaking is afoot. Recently, in 2011, the Cabinet issued a ministerial decree mandating JWU to undertake the management of sanitation services within its jurisdiction area and collect the respective fees.

The JWU is supervised by a Board of Directors consisting of seven (7) members. Five (5) members are from the participating municipalities: Ramallah (2 members including the Mayor), Al Bireh (2 members including the Mayor) and Deir Dibwan (1 member); One (1) member form Kufur Malik village; the remaining member is designated by the Government. The supervisory board's duties include reviewing and approving the budget, work programmes and projects, prescribing water tariffs and subscription fees to consumers, and setting the personnel regulation. The board appoints the General Manager who manages the daily affairs of the undertaking.

Table 5-5 presents the general characteristics of JWU. And Figure 5-15 provides graphical presentation of JWU governance. Besides, Annex 2 presents the summary of the assessment of the governance of JWU. It comprises the basis for the next sections.

Table 5-5 General Characteristics of JWU - Selected Metric Indicators

General Characteristics of JWU	*2013*	*2014*	*2015*
Population served	320,514	-	335,021
Number of customers	55,703	59,195	61,598
Connections	25,821	26,968	27,332
Number of employees	236	256	256
NRW	25.8%	25.7%	27.9%
Staff per 1,000 population served	0.74	-	0.76
Staff per 1,000 customers	4.2	4.3	4.2
Staff per 1,000 connections	9.1	9.5	9.4
Service coverage, water supply	99%	99%	99%
Service coverage, sewerage	N/A	N/A	N/A
Working Ratio	0.93	0.91	0.90
Average tariff (NIS per cubic meter)	6.77	6.90	6.92
Accounts receivable as a share of annual revenue	19.6	19.5	18.9

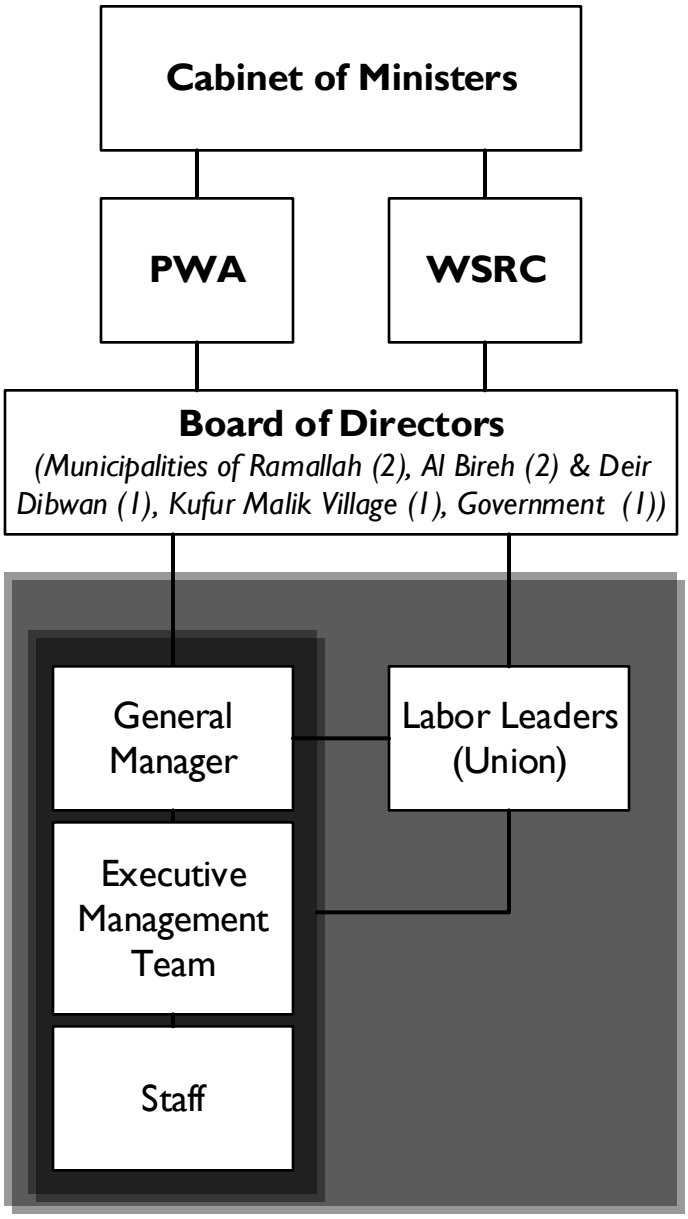

Figure 5-15 JWU Governance (developed by the researcher)

5.3.2 Institutional Environment

5.3.2.1 External Autonomy

The responsible authority at the Government level is the PWA. It indirectly plays a role through setting sector legislations and policies. Besides, JWU is regulated by the WSRC.

The Ministry of Health (MOH) sets the standards for the drinking water quality in cooperation with the PWA. The quality of water supplied by the JWU must conform in all aspects to the prescribed standards and specifications (namely bacteriological and chemical aspects).

The Jordanian foundation law of JWU gives the power for the appointment of the General Manager to the Board of Directors (BoD) with approval from the Minister. The appointment is based on merit and qualification.

The nature of the labor market in Palestine makes JWU relatively attractive for qualified staff. In general, JWU does not face external obligations or constraints in the recruitment of staff. According to the internal regulation, all positions must be open for internal applications first and only afterwards are made open for external application. The utility determines its own human resources/ personnel regulation and salary scales. The salaries of new staff are comparable to those in the public sector.

Rehabilitations and investments are financed from external sources through donors with certain agreed percent of contribution by JWU (in-kind and monetary contributions). In the recent years, JWU has financed about 20-30% of the investments per year from its own sources. The remaining was provided through the KfW Development Bank (KfW) for water loss reduction. JWU has also raised part of the capital through soft loan (€ 11 million were financed through KfW as 50% soft loan and 50% grant, where the Government represented by the MoFP is the guarantor).

The availability of water resources is not sufficient for JWU's demands, but water quality is sufficient. About 87% of JWU's water is purchased through the WBWD.

JWU determines the tariffs for its water supply services. Under the new water law, the tariff proposal shall be approved by the WSRC (the regulator). If the recipient of the services fails to pay the bills, JWU takes the action to disconnect its customer.

Table 5-6 summarizes the key indicators on external autonomy and how it applies for JWU.

Table 5-6 Key Indicators on External Autonomy (developed by the researcher)

*Indicator**	*How It Applies to JWU*
Who determines the pay scales for the various levels within the utility?	The Board of Directors
What is the basis for appointing members to the Board of directors?	• Two members elected by the Municipal Council of Ramallah • Two members elected by the Municipal Council of Al Bireh • One member elected by the Municipal Council of Deir Dibwan • One member elected by the Village Council of Kufur Malik • One member appointed by the Government. Membership of elected representative of the Municipal Council shall terminate with the termination of their membership in the Municipal Council for which they were elected.
Is the utility able to take out loans without prior approval from the owner?	No, Prior approval of the BoD (the like shareholders) must be obtained
Is the utility allowed to terminate service delivery to defaulters?	Yes
Who is responsible for setting tariffs?	The tariff is proposed by the utility and must be approved by the BOD, and has to be approved by the regulator (the WSRC under the new water 2014)
Does the utility follow public sector procurement rules?	No. the utility has its own procurement policy and rules approved by the BoD

* The indicators are as defined by (Baietti et al., 2006).

5.3.2.2 External Accountability

JWU reports to the Board of Directors on all aspects of the utility operations and performance, financial, technical, and operational, in their regular meetings and on annual basis (in line with the production of the end-of-year reports and financial statements). JWU reports to the Government selectively based on voluntary disclosure and as the need may arise. The PWA will not intervene, as long as the JWU sufficiently performs its task of providing reliable water services to its customers. JWU has to provide the partner donor with progress reports about the status of the co/financed projects and their implementation including information about the utility performance supplemented with annual reports and financial statements. The JWU also submits information to the WSRC about its performance indicators. From time to time, JWU publish reports on its performance to the public. JWU has used to establish short, medium and long-term investment plans for the rehabilitation and development of its network and facilities (the first water supply master plan was prepared in 2000, then it was updated in 2015 with 25-30 years planning horizon). These plans have to be in accordance with the municipalities, towns and villages' spatial planning. Such studies are shared with the PWA and the relevant stakeholders including the donor (the financier of the latest master plan study was KfW). In the recent years, JWU has developed three-year strategic

business plan which defines a set of goals including targets on reliability of water supply, integration of wastewater services within its mandate, financial sustainability, and customer service, and short-term indicators. Furthermore, the JWU must adhere to the targets and the performance indicators defined in its contracts with donors.

The main lines of accountability for JWU are:

- To its owner—under the utility statutes, the supervisory board must be informed on on-going basis with all of the utility operations including the financial situation of the utility and its plans. The GM has to present all relevant financial information including the annual balance sheet and the other financial statements, as well as the budget for the next year and the annual plans to the Board for their examination and approval. End-of the-year accounts are audited by an independent external auditor.
- To its regulators—WSRC is responsible for monitoring all utility operations (production, transportation, distribution, consumption, and wastewater management (assumed to take place in the near in future), to ensure water (and wastewater in future) service quality and efficiency to consumers at affordable prices.
- To financial institutions—to the outside financing agency (KfW Development Bank), a quarterly progress report on the project(s) is required with information about own contribution. Annual reports concerning revenue, profit, loss, budget and cash flow statements and own contribution are also required. An external auditor acceptable to the KfW shall be assigned for the project.
- To consumer organizations and NGOs—there are no formal customer organizations to which JWU is accountable. The JWU has a standard water supply contract which explicitly states the rights and obligations of the JWU/customers.

Table 5-7 summarizes the key indicators on external accountability and how it applies for JWU.

Table 5-7 Key Indicators on External Accountability (developed by the researcher)

*Indicator**	*How It Applies to JWU*
Does the utility have a customer charter that specifies performance targets, and are there any financial penalties for nonperformance?	No
Does the utility have to meet specified performance targets set by or agreed upon with the owners?	Yes
Is an annual report produced that is audited by an external accountant?	Yes, the annual report is produced by the utility. The external accountant is responsible for auditing the annual financial statements. All for the use and approval by the BoD.
Are external groups represented in advisory or management oversight bodies?	Yes, Government Representative.
Has the utility secured loans in the commercial market on its own credentials or ability?	Yes
Does the utility participate in some form of credit-rating scheme?	No
Does the lender impose financial covenants on the utility?	No, the Government is the Guarantor (in the case of the existing loan).

* The indicators are as defined by (Baietti et al., 2006).

5.3.2.3 A Tool for Mapping and Assessing JWU's Accountability Framework

Figure 5-16 maps JWU to the stakeholders in its environment, as well as the level of power that each stakeholder has on the utility. The diagram is used as a tool for analyzing the utility accountability and autonomy. It is not an exact metric of accountability, rather a visual illustration of the balance of powers around the utility (van Ginneken and Kingdom, 2008), where each corner in the diagram represents a stakeholder that the utility is accountable to.

The accountability framework of JWU includes eight main actors, and thus the diagram is octagon with (8) corners. The shape includes three contour areas/levels. The outer contour area represents the highest level of accountability, and the inner contour area represents the lowest level. The degree of influence of each stakeholder is then assessed as low, medium or high. Finally, the surface area enclosed inside the black line represents the relative degree of accountability of JWU to the various stakeholders. In the case of JWU, it is a large surface area where the powers of the BoD are balanced by others that have the functions of financing (Donors and Customers), policy-making (PWA), regulation (WSRC) and water wholesaler (WBWD).

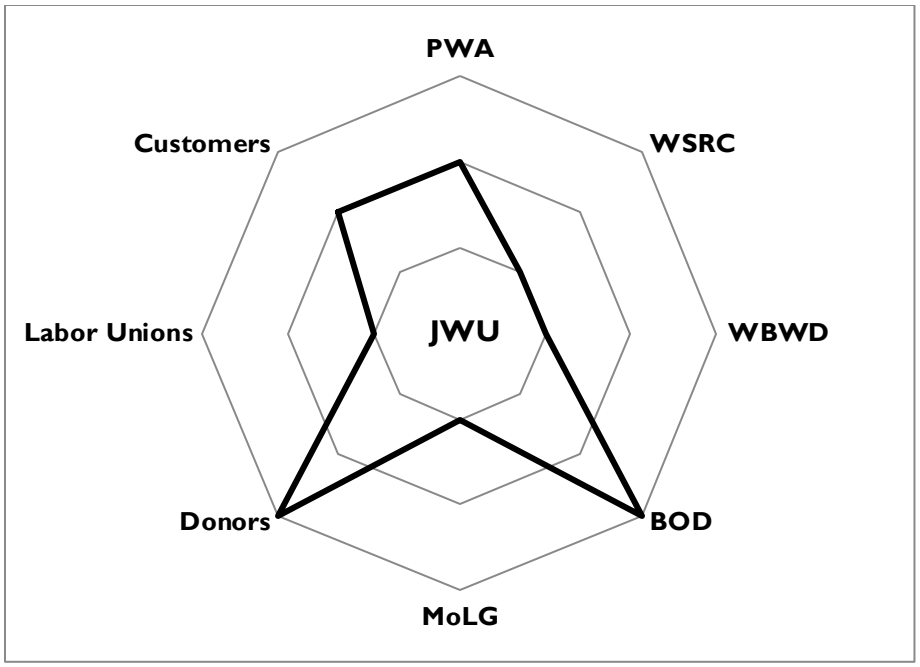

Figure 5-16 Accountability Framework of JWU, A Close-up on External Accountability (developed by the researcher)

As shown on the map, the accountability and thus shape of the diagram are determined by the financial flows to a large extent. The international donors such as the KfW have been instrumental in providing access to financial resources to JWU (through the Ministry of Finance and Planning as a result of the annual inter-governmental negotiation sessions). And the customers' influence is largely connected to the revenue they generate for the JWU. About 98% of the JWU's revenue comes from the customers. The PWA outlines the policies to which the utility must adhere through the regulator (WSRC). Furthermore, it plays a role in the availability of financial resources for the utility because investment decisions on WSS are made by it through recommendation to the Ministry of Finance and Planning.

REFORM ACTIONS

For improving JWU's balance between autonomy and external accountability, the following reforms are prioritized:

- improving the accountability mechanisms by enforcing the key regulatory functions of the WSRC as stipulated in the new water law,
- agreeing among PWA/WBWD and JWU on a plan for securing extra water resources to JWU and on a subsidy scheme for dealing with the tariff deficiencies in certain hotspot areas (i.e. in Jerusalem and probably the Refugee Camps), and strengthening JWU in maintaining its mandate in Jerusalem,
- revitalizing JWU's own water resources,

- turning the focus for strengthening the relation between JWU and its customers,
- maintaining JWU actively linked up to PWA and donor investment programming.

5.3.3 Internal Functioning of the Utility

5.3.3.1 Internal Autonomy: Decentralization of Autonomy within the Utility

Decisions about human resources management (hiring, dismissal, promotion and the structure of incentives for employees), financial management (budgeting, expenditures …), customer management, operation and investments are centralized within JWU. Powers delegated to middle levels are exercised according to orientations determined at central and/or senior level.

Hiring decisions are made by a recruitment committee convened by the board or the General Manager depending on the level of the position. For senior positions, the committee is headed by a board member. For other positions, the committee is headed by the general manager or senior staff member delegated by him. The board and the general manager decide on the termination of service during the probation period if it involves senior positions, otherwise the general manager takes such decisions (in consultation with the responsible department director). The board and the General Manager decide on promotion of staff members; senior positions and the other professional grades and nonprofessional grades.

Tariff proposals shall be prepared in accordance with PWA's adopted policies. The GM proposes tariff increases to the board who ultimately decide on tariff setting. However, all tariff increases proposals are subject to the regulator (WSRC)'s approval.

All procurement is undertaken by the JWU's Administrative Department through its Procurement Division. The JWU procurement policy stipulates the procurement ceilings. Expenditures of NIS 201 to NIS 3,000 would require the General Manager approval. Expenditures of NIS 3001 to NIS 29,000 would require the approval of the Purchasing Committee (this committee is composed of the General Manager and two department directors). Expenditures above NIS 29,001 require approvals from Tendering Committee (composed of the BoD chairman and three BoD members and the General Manager). The ceiling for the miscellaneous purchases of each department is NIS 500 (per month) and these expenses are subject to the approval of the department director.

Decisions about termination of service provision to defaulters are made according to a standard procedure and after satisfying set conditions whereby the collection section gives instructions to the JWU's disconnection staff of the need to terminate service. The procedure involves the application of interest and fine on overdues and a computerized customer notification system as well.

Regarding the customers' complaints, the usual practice when a complaint is made is that a JWU customer service representative visits the customer in order to determine the best course of action.

Table 5-8 summarizes the key indicators on decentralization of authority within the utility and how it applies for JWU.

Table 5-8 Key Indicators on Decentralization of Authority within the Utility

*Indicator**	*How It Applies to JWU*
What is the purchasing ceiling for procurement of operational departments as a percentage of operational budgets?	NIS 3,001 to NIS 29,000: approval from committee chaired by the General Manager and two department directors. For amounts in excess, approval from committee chairman (chairman of the board) and three board members and the general manager.
Does the hiring of staff members in departments require prior approval from the managing director?	The decision to include additional recruitment within a departmental budget requires approval by the board.
How many layers of management separate the chief executive and the entry-level workers?	Four layers.
At what level are internal work processes and standards defined?	Job descriptions for all positions are defined including the qualifications required for each job.
In what areas do field staff have decision-making powers?	All field staff have decision-making powers within a defined set of procedures.

* The indicators are as defined by (Baietti et al., 2006).

5.3.3.2 Internal Accountability for Results

The evaluation process of the staff is a formal annual practice at JWU. The procedure followed during evaluation is decentralized to the senior level. The evaluation system was designed taking into consideration the positions' levels (a special evaluation form is designed for each level, for the General Manager, seniors, middle managers and supervisors, and workers). The evaluation grades determine the performance bonuses for employees. In general, the measurement system is not a strong incentive for performance. Adherence to procedures is perceived by the staff as more important than achieving the performance targets. Usually, a committee (jury) is established by the GM at the end of the process in order to look at the objections coming from employees on the given grades and so to judge evaluation results.

In the recent years, managers are instructed to keep record of good and bad performance issues of employees on a continuing basis as a support to the formal evaluation taking place at the end of the year.

Internal monitoring reports are also produced on regular basis in order to track some aspects of staff performance (such as sick and annual leaves, morning retards, types and number of calls made, etc).

A formal penalties list specific to JWU is also in place to ensure that staff members comply with the performance requirements including discipline. The penalties list is in compliance with the labor law and has been approved by the MOL. Non-financial rewards are also applied.

Table 5-9 summarizes the key indicators on internal accountability for results and how it applies for JWU.

Table 5-9 Key Indicators on Internal Accountability for Results

*Indicator**	*How It Applies to JWU*
How often does the chief executive meet with the board?	Once every month, and shall have additional meetings as it may deem necessary for the proper performance.
Are penalties and rewards applied to the chief executive and directors for failing to achieve or achieving specified performance targets?	Penalties are applied (according to JWU's penalties list), Non-financial rewards applies.
Are penalties and rewards applied to the staff by the management for failing to achieve or achieving specified performance targets?	Penalties are applied (according to penalties list), Non-financial rewards applies.
Are staff members subject to annual evaluations of their functioning?	Yes

* The indicators are as defined by (Baietti et al., 2006).

5.3.3.3 Market Orientation

JWU outsources the following activities and services: network construction and rehabilitation, certain operational functions, consulting services for design, planning and project permitting, and legal advisor services. Procurement of outsourced activities is made through the JWU's Administrative Department according to the procurement guidelines of JWU (or that of the donor if the outsourced service is financed by the donor). The framework and the specifications are determined by the related departments.

Engineering design, works supervision, meter reading and revenue collection are not outsourced and are directly performed by JWU.

At the national level, JWU participates in the benchmarking exercise carried out by the WSRC on yearly basis since its establishment as an independent regulator. Service quality, efficiency standards and finance efficiency are the benchmarked parameters.

JWU has experience in implementing pilot projects for testing new technologies before full scale project implementation (for example testing some types of water meters before wider application).

Table 5-10 summarizes the key indicators on market orientation and how it applies for JWU.

Table 5-10 Key Indicators on Market Orientation

Indicator *	*How It Applies to JWU*
What is value of contracts outsourced as a percentage of the operational budget?	Indefinite Quantity Contracts are used on annual basis. The annual expenditures reach about NIS 4 million own resources (about 4% of the operational budget).
What is the nature of the functions that are outsourced?	Rehabilitation, maintenance and repairs of fixed assets and new pipe laying, consulting services for design and planning.
How often does the JWU engage in benchmarking exercises?	Roughly on annual basis since the date of operation of the WSRC.
In what areas are benchmarking activities undertaken?	Numerical benchmarking.
Does the JWU engage in market testing, and does it develop internal markets?	Yes, JWU had experience in pilot projects.

* The indicators are as defined by (Baietti et al., 2006)

5.3.3.4 Customer Orientation

Over the last years, JWU implemented a number of measures signaling increased orientation towards customers. At the organizational level, JWU has increased the level of the customers services function from division level to department level. In parallel, JWU has implemented a friendly billing system which is mobile using portable printers (for printing the bills on-site) and data terminals (for reading the customers' meters).

Mechanisms to receive, process and resolve customers' complaints are there. All information pertaining to customers is registered using a computerized system (customers and billing system). Between 5800 and 8000 complaints are received each year. In general, the response times to complaints are low. On the other hand, JWU provides warning of scheduled water cut-off or maintenance activities that will disturb services through its official webpage of social media and sometimes through the public media (TV, radio …).

Customers can contact the utility in person (through the main office, and regional offices), through a 24-hour call center, or on the internet (JWU electronic web portal, and social media). The bills can be paid by the customers at JWU main office, in the selling points, in banks or directly to the collectors. The collectors are paid in proportion to collected bills.

In addition, JWU implemented public relations programs targeted to improve relations with customers, and enrolled its staff in a number of training courses on customer service.

Table 5-11 summarizes the key indicators on customer orientation and how it applies for JWU.

Table 5-11 Key Indicators on Customer Orientation

*Indicator**	*How It Applies to JWU*
In what ways can the bills be paid?	At JWU main office and in selling points, and banks.
In what ways does JWU proactively seek the opinions and views of its customers?	Suggestion box at the main office, web portal and Social media.
What options for the service delivery does JWU provide?	House connections, tanker filling points.
In what ways does JWU actively inform its customers	Press, newspapers, Internet, radio, social media, on the bill itself, meetings with local authorities.
What is the percentage of complaints addressed?	More than 90%
What are the average response times to complaints?	New connection, 14 days ; leaks, 17 hours

* The indicators are as defined by (Baietti et al., 2006)

5.3.3.5 Corporate Culture

According to the current organizational structure of JWU which was made into effect in 2014, there are six functional departments: Engineering, Water Operations, Business and Finance, Customer Services, Administration, and Information Technology. On above, the development of the new organizational structure took into consideration the addition of new departmental box for the Wastewater Operations which will be responsible for handling the functions of collection, treatment and disposal of wastewater, stormwater and all related requirements. This is in compliance with the ongoing formal dialogue to integrate wastewater services by JWU in [the near] future. The additional work to detail the structure tree under the new department along with the accompanying functional adjustments in the other departments to cope with the increased workload will take place at a later stage by making use of synergies arising from the parallel implementation and the subsequent operation of the new sanitation investments projects JWU today is responsible for as the project executing agency.

In general, there is recognition by the staff that JWU is on the way to be a central water and wastewater utility that needs to survive the merger of services and thereby the need to change. The strategic planning efforts incorporated this foreseen change in JWU's vision and mission statements which were adopted by the Board of Directors in 2013.

JWU's vision and mission statements are visible and known to the employees. The statements are read as follows, respectively:

"*The Leading Water and Wastewater Utility in Palestine*"

"*To provide affordable and reliable water & wastewater services within its jurisdiction area to meet the needs of the beneficiaries; and to enhance JWU's sustainability and independence through good governance and complimentary arrangements with sector stakeholders*".

JWU's medium-term strategic planning initiatives according to the three-year strategic plan (2016 - 2018) are as follows:

- Using a Demand & Supply Management process to address the water supply and NRW issues;
- To achieve the targets in the Action plan for the waste water project[4];
- To improve the efficiency of the water distribution system;
- To achieve Financial Balance
- To address the changing corporate function and upgrade the business services

Since 2014, JWU has embarked on planning and implementing annual training programmes for the staff based on locally determined needs. For example, in 2014, 80 employees have participated in 15 local training courses. The average annual spending on training activities constitutes approximately 0.16% of JWU operational budget. Besides, JWU is relatively active in participating in local and international workshops, training courses, conferences arranged by other institutions in the sector (like PWA, WSRC …NGOs) which are mostly financed by donors.

The promotion of staff is determined by a number of factors, the competencies for the post, the performance profile of the employee, and the years of service. Salary increases take place once a year according to the standard procedure of the annual staff performance appraisal process.

In general, JWU exhibits stable employment with low staff turnover. Staff turnover is mostly related to personnel retirement or to lower level staff members who are appointed on contract basis for limited periods.

Daily attendance shall be registered by the employees. An electronic system is in place for this purpose. The register is monitored by the human resources division. Absenteeism and coming late (without reason or prior notice) are not tolerated in JWU and even penalized.

The management communicates information to various directors of departments, and subsequently to heads of divisions and sections mostly on a need to know basis. Meetings and internal memos are the main methods to share information.

Table 5-12 summarizes the key indicators on corporate culture and how it applies for JWU.

[4] The action plan is for building and operating the central WWTP of Ein Jariot –Betunia by JWU as a nucleus project for the transf0er of the provision of sanitation services to JWU in its area.

Table 5-12 Indicators on Corporate Culture

*Indicator**	*How It Applies to JWU*
What factors influence promotion, salary adjustment decisions, or both?	Promotion depends on the employee's competencies with respect to the required ones of the post, performance, years in service, current estimated potential.
What is the annual staff turnover?	<1%, staff retirement or lower level employees.
What are the training costs per year as a percentage of operational budgets?	0.16%
Is the staff informed about meetings of management?	On a need to know basis.
What is the ratio of support/technical staff to management?	1:11 (the percentage of management and middle management of total employment is 9.5%).
Is the mission statement internally visible in JWU?	Yes.

* The indicators are as defined by (Baietti et al., 2006)

REFORM ACTIONS

Based on the assessment above, the following reform actions are suggested to improve the internal functioning of the utility including the elements of internal autonomy, internal accountability, market orientation and corporate governance:

- Internal Autonomy — increasing the degree of involvement of the middle-management staff in the decision making process (enlarging the base of decision-making process).
- Internal Accountability — setting clear and measurable performance targets for staff according to which they can be evaluated on regular basis. Actively involve middle managers in the evaluation process of staff. Revising and optimizing work procedures on continuous basis and accordingly refining job descriptions for staff.
- Corporate Governance — enhancing staff awareness and buy-in to the mission statement. Having more concentration on human resources management, in specific with regards to the recruitment decisions and working on filling the gap between the old-generation and the new-generation staff by improving the work culture through the mentoring role of seniors and filling the middle management level positions. Building and retaining a skilled workforce for certain functions (with paying careful attention to decisions related to internal movements or job rotation).
- Training — improving the "selection process" of subject areas, training topics and the target employees in a participatory and systematic way. Offering more, and more relevant, training covering technical, non-technical, financial and especially managerial and business aspects. Making use of local and external training opportunities. Increasing the level of participation and attendance in relevant local and international conferences, workshops, seminars, exhibitions, fairs etc.
- Outsourcing — assigning part of the engineering design and some IT services to external consultants and specialized firms with implementing sufficient control and

monitoring over the consultant's performance. Improving the monitoring and supervision of current outsourcing contracts especially that for construction, repair and maintenance.

- Customer Orientation — conducting customer surveys on regular basis for assessing customers' willingness to pay connection fees and consumption charges, for updating and re-evaluating their classification. Encouraging feedback or complaints through various modalities. Improving the response time to complaints. Improving the communication with the customers. Working on the development and adoption of customer charter.

5.4 Achieving Financial Sustainability, Meeting Revenue Requirements and Setting Tariffs

This section is the fourth of seven sections in the Results and Discussion Chapter (Chapter Five). Section one provided the foundation for the discussion by assessing the Palestinian WSS sector and utility governance and by analyzing the political context in which JWU utility operates. Section Two presented an identification of the stakeholders and their analysis in view of the JWU utility reform. Section Three presented the third building block for reform which involves analyzing JWU with respect to the characteristics of well-performing utilities: autonomy, accountability and market orientation.

This section studies the keys towards JWU's financial sustainability and focuses on how to run JWU as a successful utility by employing good financial practices for ensuring services are efficient and meet consumer needs.

5.4.1 Accounts and Accounting System

JWU entries and financial records are kept in accordance with private sector accounting practice (accrual system) rather than the cash-based system used in the municipalities and the other WSS service providers in the Inland and Coastal Regions. JWU accounting system includes a simple cost accounting system that allocates expenses to main cost centers. The expenditures are separately allocated to: production, water purchasing, distribution and administration. JWU abides to the International Financial Reporting Standards (IFRS) issued by the International Federation of Accountants (IFAC) and to the generally accepted government accounting principle in Palestine. A Certified Public Accountant audits the JWU accounts and prepares its final accounts and balance sheet at the end of each fiscal year. The fiscal year starts in January 1st and ends in December 31st.

5.4.2 Revenues and Costs

The total operational revenue of JWU is generated from three major sources. The revenue structure is presented in Table 5-13. It is noted that the water sales have the largest contribution to JWU's revenues.

Table 5-13 Major Sources of Revenue and their Corresponding % of Total Operational Revenue (as presented in the Financial Income statement)

Source of Revenue	*2012*	*2013*	*2014*	*2015**
Water sales	81.70%	82.99%	81.37%	81.10%
Water meter fees / Subscriber fee	6.23%	6.43%	6.10%	6.54%
Connection fee	12.07%	10.58%	12.54%	12.36%
Total	100%	100%	100%	100%

* In 2015, the JWU revenues totaled 98.72 million NIS.

The cost structure and the change in the different ratios of operating expenses of the JWU are presented in the Table 5-14. JWU bases the calculation of the depreciation cost on the historical value of its assets (at the end of the year) and by using the straight line method.

Table 5-14 Summary of Cost Ratios Based on Cost Items (of the Financial Income Statement)

Cost Item	*2012*	*2013*	*2014*	*2015**
Purchasing of water	48.45%	44.08%	43.13%	44.13%
Electricity consumption (operating)	9.99%	8.62%	9.29%	7.84%
Personnel expenses (operating)	18.58%	19.27%	19.06%	18.23%
Maintenance	1.55%	3.25%	0.96%	0.88%
Administrative expenses	11.49%	11.09%	14.11%	14.23%
Other operating expenses	1.66%	2.59%	0.33%	1.16%
Asset depreciation	4.62%	7.40%	9.54%	9.99%
Bad debt amortization	3.66%	3.71%	3.58%	3.54%
Total	100%	100%	100%	100%

* In 2015, the JWU expenditures totaled 97.93 million NIS.

The water purchase costs represent the bulk of the JWU's expenditures. The applied water purchasing prices are shown in table 5-15.

Table 5-15 Applied Water Purchasing Prices

Supplier	*Price*	*Unit*	*Notes*
WBWD/ Mekorot	2.60	NIS/m^3	The amount purchased from this source represents 69.7% of the total input volume of JWU in 2015.
Hagihon	6.10	NIS/m^3	The amount purchased from this source represents 17.4% of the total input volume of JWU in 2015.

The calculated net operating costs and financial deficits including depreciation cost are plotted in Figure 5-17. It shows the development of the operating financial deficit over 10 years from 2005 to 2015. JWU generated losses in the past years in 2005 and from 2007 to 2011 with an accumulated deficit equaling to about 40 million NIS.

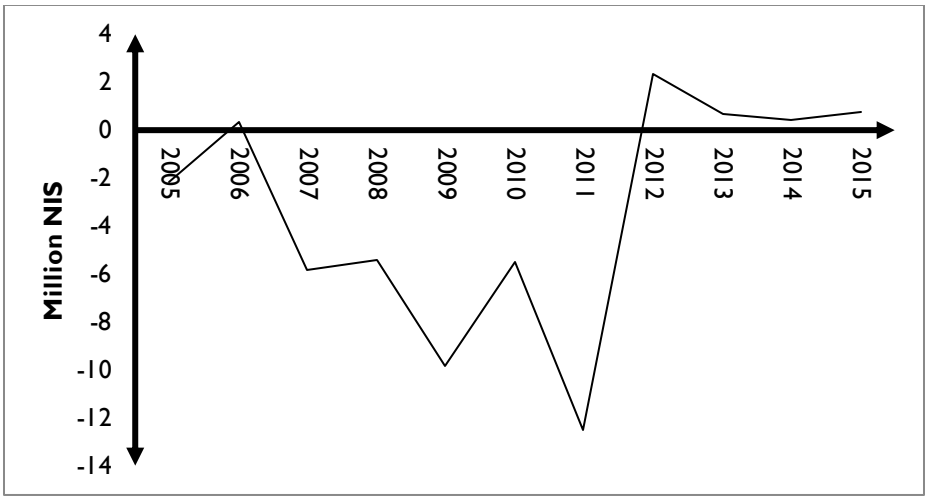

Figure 5-17 JWU's Net Operating Surplus/Deficit including Depreciation

5.4.3 Water Tariff

Before 2012, JWU used to adopt increasing block tariff system with unified tariff for domestic, public, commercial and industrial consumers. The water tariffs applied during the previous periods from 2000 to 2004 and from 2005 to 2011 are presented in Table 5-16. The static pricing period from 2005 to 2011 was accompanied with accumulating operational deficit initiated in 2005.

JWU effected an increase in its water prices in 2012. The currently applied water tariff is presented in Table 5-17. It considers the increasing block rate tariff but for the different consumption categories of domestic, public, commercial, industrial and touristic consumers. It is for two-month billing cycle. This new block tariff system enables JWU to distribute the costs more evenly among the customers.

Nonetheless, JWU is studying the feasibility of the change to adopt billing on monthly basis instead of two months. The rates of the increasing block tariff will be different as well.

Table 5-16 JWU Old Tariffs Applied during the Periods (2000 – 2004) and (2005 – 2011)

Consumption Group	*Applied Tariff (2000 – 2004)*	*Applied Tariff (2005 – 2011)*
From 0 to 10 m^3	3.40	4.10
From 11 to 20 m^3	3.80	4.60
From 21 to 40 m^3	4.00	4.85
From 41 to 100 m^3	5.20	6.30
From 100 m^3 and above	5.20	6.85
Bulk Supply	3.50	4.20
Meter fees fixed per billing cycle*	8	10
Minimum fixed charge per billing cycle	42	51

* The Billing Cycle is Two Months

Table 5-17 JWU Current Tariff Blocks and Categories (put into action since 01/01/2012)

Consumption Group	*Domestic*	*Industrial*	*Touristic*	*Commercial*	*Public Institution*	*Bulk*
From 0 to 10 m^3	4.50	5.60	5.60	5.60	4.50	
From 10.1 to 20 m^3	4.50	5.60	5.60	5.60	4.50	
From 20.1 to 40 m^3	5.60	6.80	6.80	6.80	5.60	
From 40.1 to 60 m^3	6.80	8.10	8.10	8.10	6.80	
From 60.1 m^3 and above	9.00	9.90	10.80	9.00	9.00	
Bulk Supply						4.20

Notes:
1. Two months billing period;
2. Meter fees fixed at 17 NIS per billing cycle;
3. Minimum fixed charge including meters fees per billing cycle 62 NIS (for domestic and public institutions);
4. Public institutions are government institutions, houses of worship, institutions of civil society, etc.;
5. Bulk for LGUs that buy water in bulk from JWU and resell it to customers in their service areas.

The connection fees are determined according to separate bylaw developed by JWU in 2014. It made a shift in the way the subscription fees are calculated with respect to the precedent system. Since its application, the bylaw was consolidated with many modifications (edited versions of many of its articles) that make it somehow complicated for the utility to administer. The connection fees consist mainly of fixed fee according to the type of the connection (4500 NIS for residential subscription, 7500 NIS for commercial subscription, and 5500 NIS for connection for public institution), plus building area fees depending on the area of the building and for above defined limit, in addition to insurances depending on the occupancy, and metric charges above defined thresholds depending on the length of the installations. Fees for developers (of housings, neighborhoods, etc.) follow certain agreements.

5.4.4 Affordability

JWU analysis of the affordability –at the time of the development of the currently applicable tariff– showed that the average price of water does not exceed 4% of the average household income (assuming 2000 NIS is the average income –for the customers within the first two blocks of the tariff).

5.4.5 Outstanding Customer Payments and Collection Efficiency

The total outstanding customer payments increased from 24 million NIS in year 2004 to 137 million NIS in 2015. Figure 5-18 depicts the incremental increase of debts. The high increasing rate of accumulated debts is attributed to the difficult socio-economic situation and the frame political conditions resulted after the second Intifada (the Palestinian Uprising of year 2000) including the withholding of the Palestinian Authority (PA) tax money (by the occupation government) in 2006 and thereby the incapacity of PA to pay salaries to the employees of the public sector.

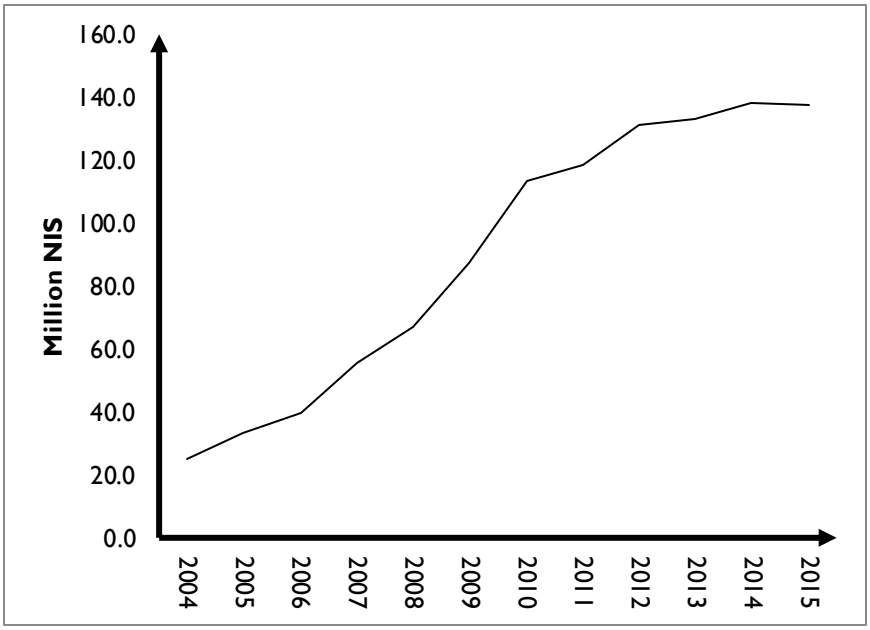

Figure 5-18 Development of Outstanding Customer Payments over Years

The collection efficiency of JWU in the whole present service area reached 87% in 2015. It is interpreted as a very good result and among the best compared to the other SPs in Palestine. However, the JWU collection efficiency in the refugee camps is very low with an average of around 5% only. The accounts show that about half of the total accumulated debts pertains to the refugee camps (mainly) in addition to the public institutions.

5.4.6 The Cooperation between JWU and Al Bireh Municipality

JWU collects the operational and maintenance sewage fees on behalf of the Municipality of Al Bireh. In return, JWU deducts 10% of the collected amounts. This is as per an agreement signed by the two parties in 2001. JWU is collecting the water and sewage fees in two separate bills. In 2015, JWU issued bills to 9790 subscribers. According to JWU, the collection efficiency was about 54.6% (not including debts). But, it was around 10.6% according to Al Bireh Municipality and including debts. The cumulative debts for O&M sewage fees are depicted over the period from 2011 to 2015 in Figure 5-19. The figure shows the growth in the number of subscribers over the same period.

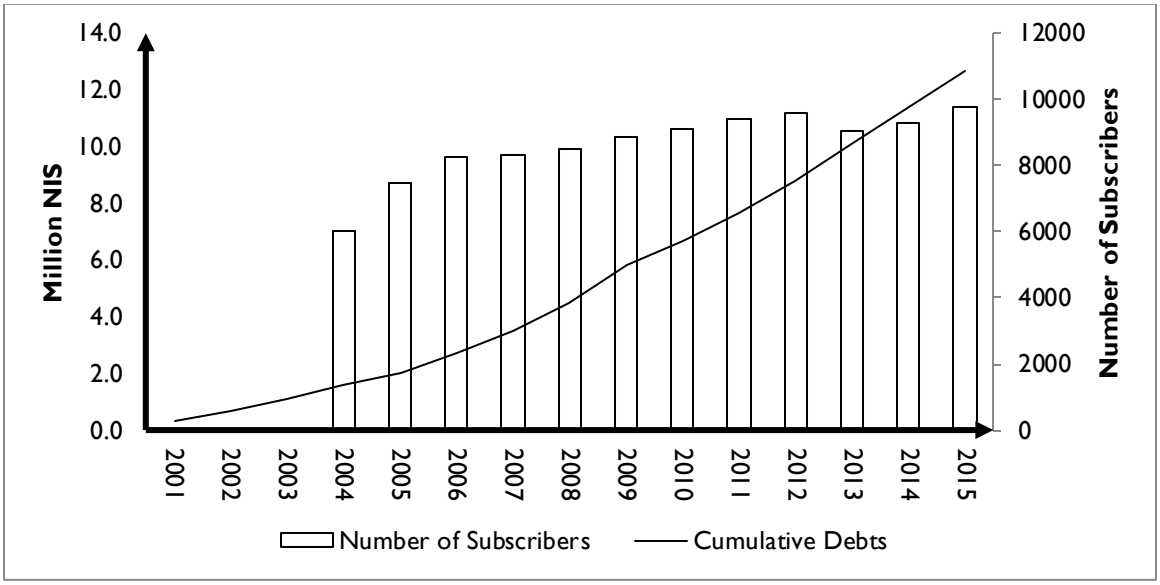

Figure 5-19 Cumulative Debts for O&M Sewage Fees over the Period 2011-2015 before any Financial Settlement between Al Bireh Municipality and JWU and the Growth in the Number of Subscribers from 2004 to 2015 (developed by the researcher)

The O&M sewage fee has been set by the Municipality at 1.8 NIS/m^3 of water consumed since 2008. Table 5-18 summarizes the connection and O&M fees applied by the municipality since 2000 (the year of operation of Al Bireh WWTP) till now with the information that the connection fees are totally managed by the Municipality.

Table 5-18 Al Bireh Municipality Connection and O&M Sewage Fees

Connection Fees	*Applied O&M Sewage Fees*	
2000 – Present	*2001 – 2007*	*2008 – Present*
3.000 JOD per square meter of building 0.300 JOD per square meter of empty land 10.000 JOD fixed fee for connection fee	1.2	1.8

REFORM ACTIONS

Based on the above discussion, the following reform actions are suggested to improve the financial sustainability of JWU by meeting the revenue requirements:

- Tariff — regularly reviewing the tariff of the provided services on the basis of the development of the costs. The water tariff (the level and structure of the fixed and volumetric charges) should be designed to cover all efficient costs of the service (i.e., to meet the full revenue requirements of the utility with specific attention to the capital structure and the revenues that can be obtained from tax payers), to meet the objectives to distribute costs across customers in equitable ways (i.e.; offering discounted rates for low-income customers) and to provide incentives for water conservation. This is with ensuring that the tariff structures are simple and transparent (i.e.; easy for customers to understand and not complicated for the utility to administer).
- Billing Cycle — conducting further research and comprehensive (feasibility) study as the basis for taking the decision about changing the billing cycle from two months to one month. Tools like conducting customers survey about the customers' preference and piloting representative billing zones can help in making the decision.
- Connections Fees — reviewing the respective bylaw including the structure of the charges and the requirements for connection so that it is simple, transparent and easy for the utility to administer and for the customer to understand; finding tariff tools to expand the network; offering encouraging schemes for the split of the group connections (one connection serving a number of households).
- Collection Efficiency — working on optimizing the work of the readers and the collectors of the bills by studying the routes of the collectors, the size and the distribution of the billing zones,
- Financial and Accounting Policies — continuing with the work to write and put into practice the financial and accounting policies specific for JWU.
- Legal Base — intensifying the legal actions towards the non-payers with high accumulated debts; intensifying the coordination with the police for disconnecting illegal connections. On the other hand, playing active role in the discussions and the reviews to be taking place during the formulation of new tariff policy at the national level, and actively convey the opinions, experience, requirements and the concerns of the JWU utility to the policy maker (PWA) and to the regulator (WSRC).
- Collection of Debts — negotiating with the government with the aim to reach a formula for resolving the accumulated debt of the refugee camps; and negotiating with the government the issue of the debt of the public institutions.
- Cooperation with Al Bireh Municipality — discussing with the municipality the problems and the challenges that are facing JWU in collecting the O&M sewage fees, and studying the possibilities for increasing the respective collection efficiency and what measures can be taken by both parties for meeting that objective.
- Awareness campaigns — raising the awareness of the customers about the costs associated with the extraction and distribution of water, the principles of tariff

calculations and the subscription procedures, the services provided by JWU, the payment procedures and the available offices.

5.5 Developing Systems for Comprehensive Asset Management (CAM) and NRW Reduction

This section is the fifth of seven sections in the Results and Discussion Chapter (Chapter Five). Section one provided the foundation for the study by assessing the Palestinian WSS sector and utility governance and by analyzing the political context in which JWU utility operates. Section Two presented an identification of the stakeholders and their analysis in view of the JWU utility reform. Section Three presented the third building block for reform which involves analyzing JWU with respect to the characteristics of well-performing utilities: autonomy, accountability and market orientation. Section four studied the keys towards JWU's financial sustainability.

This section focuses on how to run JWU as a successful utility by employing techniques for ensuring services are efficient and meet consumer needs. It involves assessing JWU's practices for designing good utility systems; operation and maintenance management, comprehensive asset management, non-revenue reduction and emergency management.

5.5.1 Comprehensive Asset Management

5.5.1.1 Planning

JWU has updated its water supply masterplan in 2015 based on a planning horizon of 25 years and with the application of appropriate service standards and assets lifetimes. The master plan resulted in a water demand forecast and in an investment plan packaged into 3 phases: phase I (2015 – 2020), phase II (2021 – 2030) and phase III (2030 – 2040). The investment plan amounted about 100 million Euros with an estimated annual investment of around 3.5 to 4 million Euros –this is to cover the investment needs in the present service area of JWU only. Their development is presented in Figure 5-20. The investments include new water sources, regional reservoirs, trunk mains, booster stations, extensions of networks and rehabilitation of networks. JWU started to implement the capital investments accordingly (i.e. according to the priorities and timing set forth in the master plan study); however this is constrained by the availability of funds with high dependence on external financing sources. As part of the master planning exercise, the asset plans were reflected in short-, medium-, and long-term cash forecasts, with assessing the impacts of assets on future tariff levels. Water supply is metered at sources and to customers; however, in the past 10 years (until 2015), the possibility of in-depth analysis of NRW is limited because of the malfunctioning of the majority of the meters. Service standards are difficult to be maintained due to the shortage of water supply because of the control of the occupation on the water sources through not drilling new wells and/or limitation on purchasing additional water to meet the continuous increase in the water demand. This leads JWU to serve its population on intermittent water supply basis. In general, other than in the master plan, Life Cycle Cost (LCC) concept is not

fully applied by JWU. And, somehow, there is an attempt to apply ISO standards as part of the planning process but training of the staff is lacking in this area.

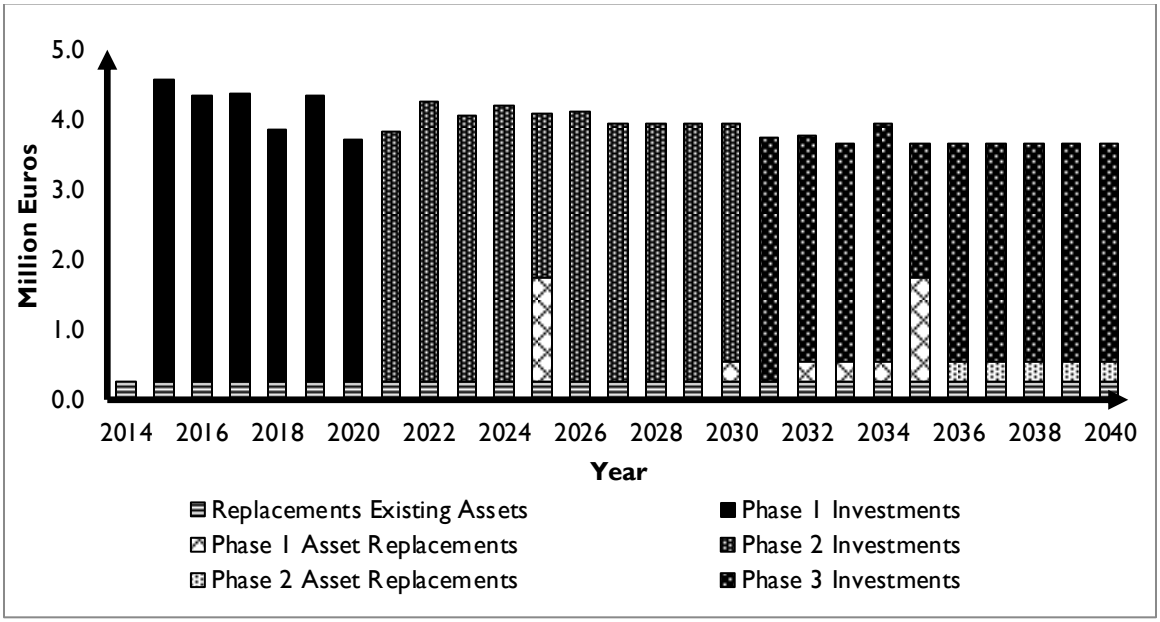

Figure 5-20 Projected Capital Expenditures (2015 – 2040), (JWU *et al.*, 2015)

5.5.1.2 Acquisition

A procurement policy is in place, and JWU is working to put into action an Accounting and Financial Policies. In general, asset proposal evaluations does not consider the technical lifespan of the assets, whole-of-life-cycle costs, maintenance needs, availability of spare parts, and compatibility with present assets.

5.5.1.3 Asset Records

There is an asset classification system which is computerized as part of the financial package software, named "FinPack". It is regularly updated but (the structure of the information) lacks information required to apply good practices. Linkage with the Geographic Information System (GIS) is not available.

JWU is separating the fixed assets into the following 8 costs categories –consisting the financial fixed assets register– where the water networks are representing the major part of the fixed assets with about 79% and the production system consisting of the water wells, equipment and pumps is the second biggest group with about 9%:

- Building, land and construction
- Water wells
- Water Networks
- Furniture
- Equipment

- Vehicles
- Reservoirs
- Pumps

JWU adopts the Cost Model for the calculation of the fixed assets. It applies the Straight Line Method for the calculation of the depreciation of the fixed assets. The used depreciation percentages are presented in Table 5-19. Actually, JWU is reviewing their procedures for the fixed assets rating as part of the development of the Accounting and Financial Policies.

Table 5-19 JWU Depreciation Periods for the Fixed Assets

Fixed Asset	*Lifespan (Years)*	*Annual Depreciation Percentages (%)*
Pipelines, Networks, Water Distribution and Production Systems	20	5
Concrete Water Reservoirs	40	2.5
Groundwater Wells	50	2
Sterilization Systems - water	20	5
Sewage Collection System *	50	2
Sewage Treatment System *	25	4
Drainage System	25	4
Temporary Buildings	14	7
Furniture	10	10
Metal Cutters	33	3
Computers	5	20
Wireless Communication Devices	4	25

* Not operated by JWU yet.

JWU took over assets put in place since its foundation in 1966. Figure 5-21 presents the development of the JWU networks over the years. Nevertheless, the JWU has been computerizing its network using GIS from scratch. JWU has introduced the GIS in 2006/2007. The GIS system of JWU stores related data in three parts: (1) base map features which are used to present the land base features (e.g. roads, land parcels and blocks, buildings, etc.), (2) water network information primarily related to pipe locations, age, diameters, depth, etc., furthermore, related features such as locations of pump stations, reservoirs, valves are also identified, and (3) the non-spatial data (tables) which store data related to the customers, water consumption, financial information, pipe maintenance records and customer complaints, this is through linkage to JWU's billing system. Generally, the current GIS covers about 80% of the JWU database related items in terms of both water network elements and baseline data. JWU is working in the right direction to update the current GIS but still needs a lot of support to complete the missing network data and particularly to systematically apply new Information and Communication Technology (ICT) developments. Information on dates of installation

and the type of material remain incomplete (in specific for the old pipelines before the installation of the GIS), and linkage to maintenance history is somehow poor and needs further development and adaptation. GIS records are updated concurrently and at the same rate of the installation of the new assets using the respective as-built drawings, the new connection files, and information from the field personnel.

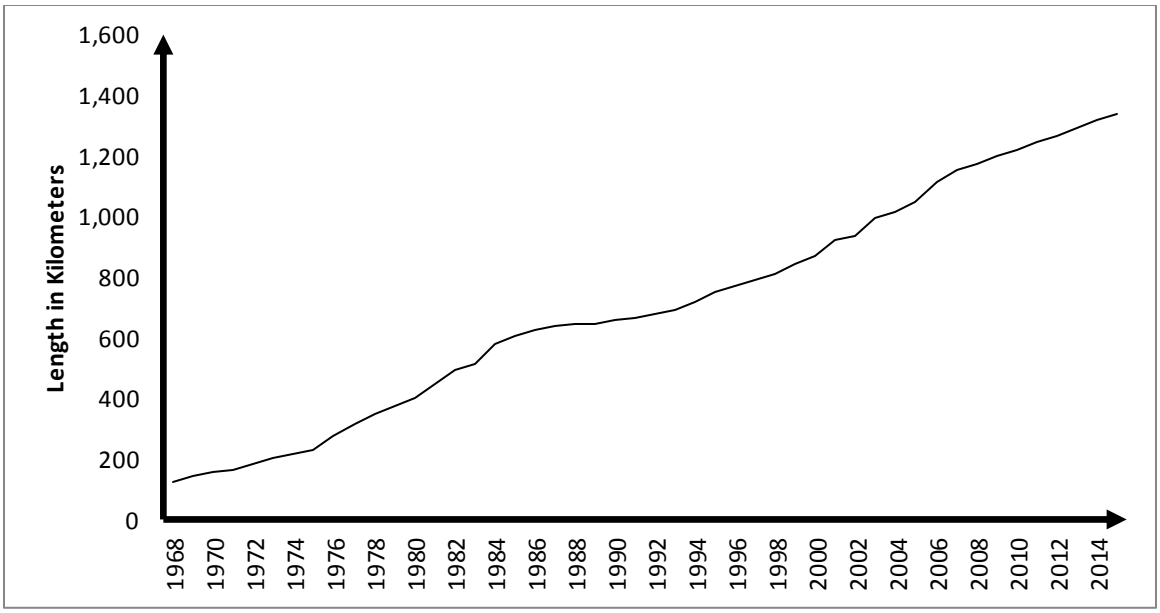

Figure 5-21 JWU Network Length Development over Years

5.5.1.4 Commissioning and Operations

The JWU ensures that the process of commissioning of new assets is formal. Standard operating procedures need to be prepared. The operators are responsible for equipment performance, monitoring and reporting, and they need additional training especially by the suppliers.

5.5.1.5 Maintenance

The JWU relies mainly on breakdown maintenance rather on preventive maintenance. Relatively, it does not at all times base its maintenance schedules on asset criticality or condition monitoring. Any existing planned maintenance does not follow advice from suppliers on maintenance frequency and procedures; instead, it is mostly based on in-house maintenance experiences. However, when breakdowns are frequent, this automatically triggers an assessment by the utility whether to repair, replace or retire the asset. There is rolling water loss reduction program, and a comprehensive water meter replacement program is launched.

5.5.1.6 Accountability

Unsurprisingly, asset management involves many different parts of the organization; yet, JWU lacks clear accountability for key asset management processes: asset acquisition, planning, operation, maintenance or asset renewal. In general, the JWU has defined roles and authorities as part of the formulation of the organizational structure but continuous refinement and optimization of the work procedures, communication flows and job descriptions are required with more focus on asset accountability. Generally, there is a culture of caring for assets but JWU has not drawn up a set of performance indicators against which to judge asset management performance. Nonetheless, non-revenue water and system breakdowns and failures, and trends on energy usage are tracked and reported with less attention on comparing planned with actual results.

5.5.1.7 Financial Management

The assets are recorded in financial statements, and they are depreciated. Maintenance costs are tracked to specific assets, and in general, JWU has good budgeting procedures. However, there is still room for improvement. Reconciliation of physical and financial asset records takes place regularly by undertaking an annual asset inventory, including reporting of the aging assets (equipment, furniture and tools). Practically there are no problems with asset identification and insurance.

Overall, JWU's asset management practices are rated as "good" and in a progressive phase, but still, a lot of work has to be done for making asset management as part of maintenance attitude and processes. Access to a pool of experts in asset management and a network to improve asset management within the utility is a challenge for JWU. For asset management to be successfully implemented there should be a formal process of developing framework within the organization which should be linked with the JWU's objectives.

5.5.2 Non Revenue Water Management

The development of water losses in JWU's water supply system over the years 1974-2015 are depicted in Figure 5-22 in terms of volumes and in Figure 5-23 in terms of percentages. The recorded values ranged between maximum value of 33.3% and minimum value of 21.2%. In 2015, the NRW level was calculated by JWU to be 27.9% of the system input which is in the order of 4.83 million cubic meters (m^3). In the recent years, JWU has introduced the WB-EasyCalc[5], spreadsheet-based software, for calculating the different components of the NRW which is based on the IWA Water Balance. It was found that the apparent losses are marginally less in volume than the real losses, where the main sources of apparent losses are: customer meter inaccuracies (mainly) and data handling errors and unauthorized consumption, and that of real losses are: leakage on transmission and distribution mains and leakage on service connections (up to the customer meter).

[5] WB-EasyCalc is a free water balance software developed by Liemberger and partners and supported by the World Bank Institute (WBI) (Farley *et al.*, 2008).

As part of the JWU water supply master which was prepared in 2015, a NRW reduction strategy was developed for JWU. The strategy included a specific SWOT analysis and an action plan with a vision to reduce its current NRW until 2025 to a value of <18%.

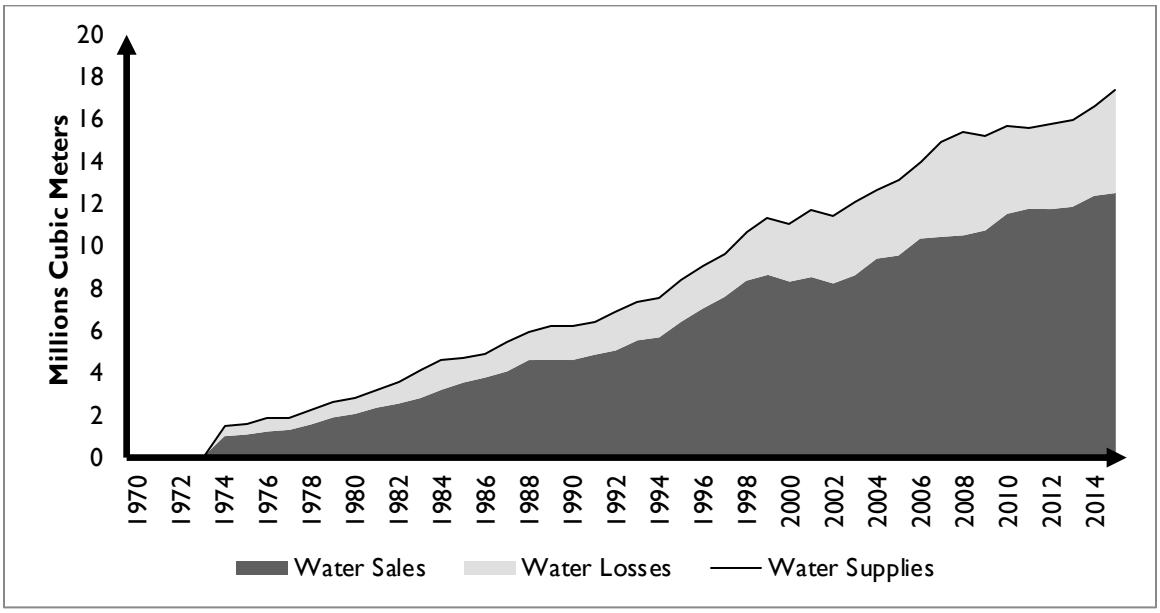

Figure 5-22 JWU Water Supplies, Water Sales and Water Losses

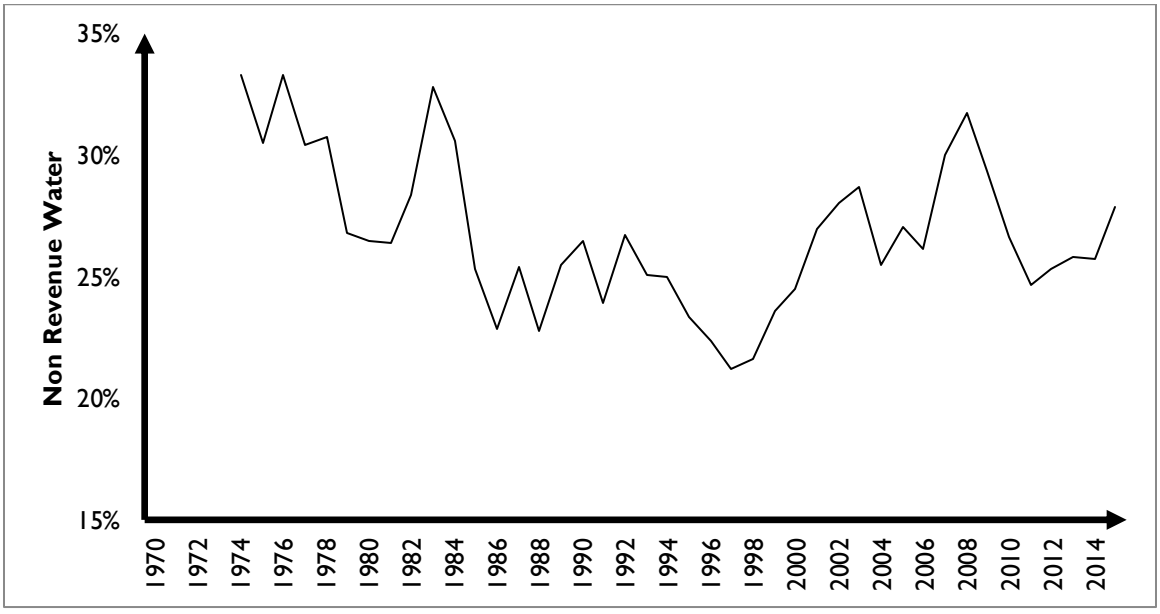

Figure 5-23 Levels of Water Losses at JWU

5.5.2.1 Water Distribution Network Management

In general, the JWU water distribution network is not split into hydraulically discrete zones where the inflow to these zones is measured. Currently, there are more or less 27 zones equipped with bulk (district) meters. However, these zones are not all hydraulically isolated and their meters are deficient in most of the cases with irregularities in reading them at specific times.

As JWU has for long time used to experience water shortage especially in summer time, JWU is pressurizing sectors of its distribution system with different supply patterns in terms of pressure, flow rates and supply times per week. To this end, JWU relies on manual operation of the valving system and staff shift work schedules. Only the production system is monitored and controlled by SCADA, but not the distribution System.

Because of the large differences in ground elevations, there are some parts of the network with very high pressures and ongoing pressure fluctuations resulting in frequent pipe bursts, higher leakages and reduced asset life, and indicating lack of proper pressure management using pressure control valves.

Generally, JWU is managing aging network with 65% of its pipes is old and needs rehabilitation. About 2400 breakages were reported and repaired in year 2015. 59% of the breakages were traced back to pipe rusting. Leakages occurred in majority in small diameter pipes with less than 50 mm (i.e. on service connections). Overall, JWU applies good practices for repairs to ensure their quality and speed including computerized tracking system.

5.5.2.2 Customer Meter Management

In the early past, JWU used a variety of ½ inch water meters which depend on water velocity to measure flow, but JWU has switched to the use of volumetric water meters (15 mm) for residential applications since 1966. The decision of JWU was successful as these meters were found to be more accurate and easy to handle, dismantle and maintain. However, there was more than one reason leading these meters losing their efficiency over the last years: ageing, excessive tear and wear of moving parts, poor maintenance of meters due to the lack of spare parts in JWU stores and in the market with difficulties of import from abroad and the cease of the manufacturer to produce such (old) generation of volumetric water meters, and the private tank lamination effect of the customer storage tanks. All of these factors caused serious problems in meters servicing and led the meters to under-register and increase their errors especially at low flows which were measured with difficulty, if at all.

In the last few years, JWU had great interest to recover the water volumes which are being consumed by the users but not paid for due to meters under-registration and which have a great impact on the utility water balance.

In order to ensure the accuracy of customer consumption data and to keep meter under-registration to minimum, JWU decided to replace all of the customers meters by the newest version of the volumetric meters and introduce associated good customer meter management practices (system condition specific meter selection, comprehensive testing and maintenance). The specifications for the new domestic meters were carefully tailored to the specific local conditions and were checked against the supplier standard specifications taking into account the meter price and the costs of ownership which are related to the maintenance, labor efforts and spare parts; i.e. the meter selection considered: the meter type, quality of manufacture, dimensions, configuration, ease of maintenance work (assembly and disassembly of meter internals), spare parts, installation requirements, metrological performance (the dynamic ratio with low minimum flow specification to measure the roof tank inflow more accurately), the starting flow of the meter (down to less than 1 liter per hour), compliance and sanitary certifications, water supply regime, communication and readiness/possibilities for remote reading, anti-tampering measures and water quality. In concert, JWU has decided to upgrade the meters workshop and replace the old meters test bench by using full automatic version of test bench with higher testing capacity.

Besides, JWU looked at ways of reducing meter readings and data handling errors. JWU's procedures stipulate that the meters are installed where meters readers can easily access and read them and where they can easily identify property's meter. JWU has standard meter stand designs according to which JWU's technicians construct customer meter installations. As well, JWU uses filters (strainers) on the upstream pipe of the meter to minimize the build-up of sediments on the internal parts of the meters to promote accurate meter recordings. Also, JWU started to intensify the use of the air control valves in the network in order to mitigate the air/vacuum effect of the intermittent water supply and to reduce the incidents of counting air volumes by the customers water meters which are mechanical meters.

For businesses and bulk metering, JWU uses multi-jet and turbine meters and in some cases has introduced the ultrasonic meters. However, JWU is planning to use single-jet meters for commercial and industrial installations that require 20 mm to 50 mm sizes, and the electromagnetic meters for district meters because of their higher accuracy.

5.5.2.3 Billing

JWU has introduced the mobile on-site meter reading scheme in 2012/2013 with the aim to eliminate the billing deficiencies, and to provide data that can assist in controlling the other two components (meter inaccuracies and unauthorized consumption) of apparent losses. The mobile system comprises of hand held data terminals and portable printers utilized by meter readers for capturing both consumption and consumer data. All data transfers to the billing system are done electronically. Linked to their roles, the readers have the responsibility to examine the customer meters to detect the need for calibration, maintenance or replacement and they should report any observed problems.

JWU is planning to apply a pilot project for the remote reading of the meters, the Automatic Meter Reading (AMR) system. The system is believed to be an efficient development with a lot of advantages.

5.5.2.4 Tackling Unauthorized Consumption

JWU has created a section with specialized crews, under the customer services department, for finding illegal connections and inspecting the disconnected meter installations of the customers whose supply is cut off after non-payment. In addition, in the recent years, JWU made intensive cooperation with relevant agencies including police to detect and disconnect illegal connections. As well, the readers should report cases of direct connections without meters that they see during their rounds, and the customers are encouraged to report illegal connections to the utility. In order to avoid corrupt meter readers, JWU implements rotating reading routes with frequent spot checks.

ACTION REFORMS

- Asset Management Plan — Preparing policy, process and an implementation plan for comprehensive asset management including asset condition assessment, asset performance monitoring and network mapping, etc., and clarifying the responsibilities and roles of the relevant staff and the different departments in the implementation of the Asset Management Plan;
- Assets Register — Reviewing the existing asset register system and evaluating how it could be integrated/linked with the GIS system;
- Assets Condition Modeling — Modelling of the assets, of the performance and capacity of the pipelines and pumps as they age, so that maintenance decisions are made based on accurate analysis of the condition of the assets;
- Critical Assets and Associated Failure Risks — Identification of the critical assets in parallel with the review of the important system breakdowns –which have immediate effects on the service of the JWU– and their categorization (in terms of the required response time to system breakdown –immediate or short-term);
- Technical Specifications of the Network — Reviewing the specifications of the water network in terms of the materials and installation specifications to increase the lifespan of the water network and reduce the physical losses, considering the local conditions and the possible suppliers for the different materials and the associated costs;
- Production System and Energy Efficiency — Systematic evaluation of the performance of the production system (the pumps) in order to minimize the energy consumption, through the adoption of appropriate performance indicators.
- Monitoring of the Performance of the Assets — Developing criteria and procedures for the monitoring and evaluation for renewed or replaced assets by giving priority to the establishment of distribution zones (district metered areas) in the planning of network restructuring and rehabilitation projects.
- NRW reduction management strategy — taking steps towards the implementation of the NRW management strategy and action plan jointly with providing the necessary qualifications and specialization trainings to the responsible key and related staff.

- District Metered Areas (DMAs) — dividing the open network system into smaller more manageable areas by designing and implementing DMAs tested in the field and using a network model, undertaking initial calculations for determining the baseline level of NRW and its components, and establishing a DMA-based monitoring program to effectively manage the system in terms of NRW, pressure control, water quality and supply to customers; all with taking into consideration the creation of pressure management zones and the application of advanced pressure management;
- Breakages Complaints System — Systematic review and evaluation of the complaints register of the different distribution zones and their categorization according to the needs for maintenance and rehabilitation and their prioritization for implementation.
- GIS — Completing the mapping of the network, regularly update the GIS and systematically apply new Information and Communication Technology (ICT) developments, with opening the opportunity for specialized international development agencies and experts to be deeply engaged in the delivery of the related services.
- Restriction of Unauthorized Water Consumption — Strengthening the work of a dedicated and fully equipped task force to monitor the disconnected customers with the aim to prevent illegal practices and unauthorized consumption.
- Customer water meters management — replacing the old meters is one taken action, however, it is required to improve the management of the customer meters by establishing regular maintenance and re-calibration procedures.
- Leak Detection — selection and training of staff for leak detection with establishing procedures for active leakage detection;
- Human Resources and Training Management — Filling the vacancies of the key positions appropriately; and improving asset management and NRW management skills by organizing asset management and NRW management trainings, and making asset management a part of maintenance attitude and processes; regular participation in national and international events related to asset management and NRW management (annual conferences, forums, etc.);
- Twinning Partnerships — entering into the experience of building capacity through establishing effective utility-to-utility twinning partnerships where activities may include short internships, on-the-job training, technical assistance, peer-to-peer exchanges, etc.
- Conducting a regional sanitation master plan as a support to widening the mandate of JWU to the sanitation services and the expansion of JWU as the central utility.

5.6 Planning the Reform

This section is the sixth of seven sections in the Results and Discussion Chapter (Chapter Five). Section one provided the foundation for the study by assessing the Palestinian WSS sector and utility governance and by analyzing the political context in which JWU utility operates. Section Two presented an identification of the stakeholders and their analysis in view of the JWU utility reform. Section Three presented the third building block for reform which involves analyzing JWU with respect to the characteristics of well-performing utilities: autonomy, accountability and market and customer orientation.

Section four studied the keys towards JWU's financial sustainability. Section five focused on how to run JWU as a successful utility by employing techniques for ensuring services are efficient and meet consumer needs. It involves assessing JWU's practices for designing good utility systems; operation and maintenance management, comprehensive asset management, non-revenue reduction and emergency management.

This section six discusses how the utility can pull together the managerial, financial, and operational reforms discussed in the previous sections, in order to develop an effective and widely-supported strategy for change. In specific, it focuses on how reforms should generally be sequenced into logical stages, both to provide space in which to maximize stakeholder buy-in, and to provide opportunities for changes to be evaluated along the way.

5.6.1 Stages in the Reform Process

The reform path is unique for each utility depending on the environment in which the utility operates and the reform will take place, Figure 5-24.

The diagnosis in the previous sections covered the reforms required in both the external environment and inside the utility of JWU. It is clear that the JWU will undergo a trajectory of reform that depends on the current performance and the key problem areas. Furthermore, JWU utility reforms can take place in a positive policy and institutional environment due to the wider sector reforms being implemented or has been achieved to date.

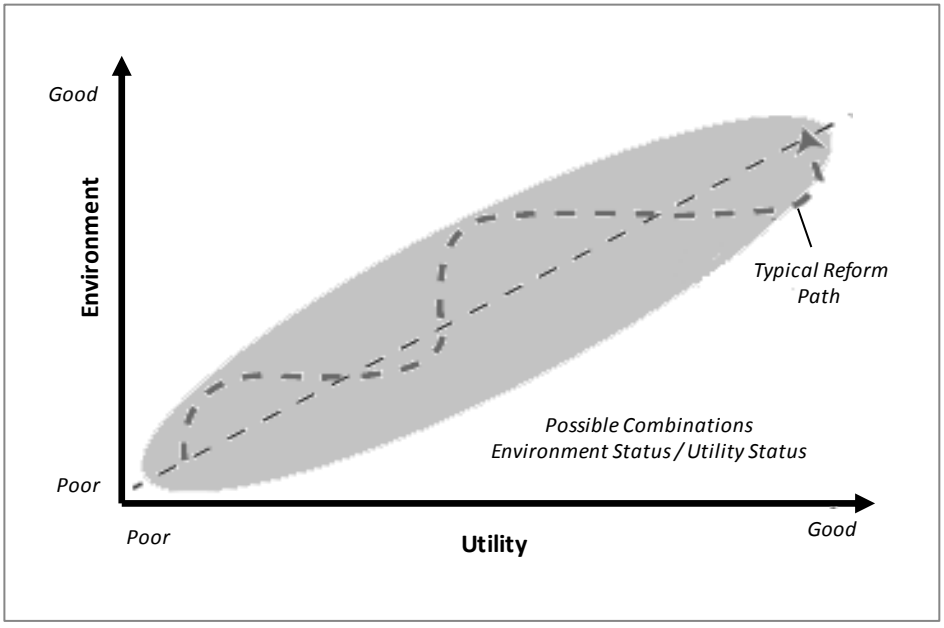

Figure 5-24 Relation between Internal and External Reforms (after van Ginneken and Kingdom, 2008)

Typically, reforms at the utility level feature three stages as follow. A typical reform process is also plotted in Figure 5-25.

- Crisis management with short term "crash" program,
- Recovery and stabilization with medium term reform package,
- Expansion and the institutionalization of reform in the long term.

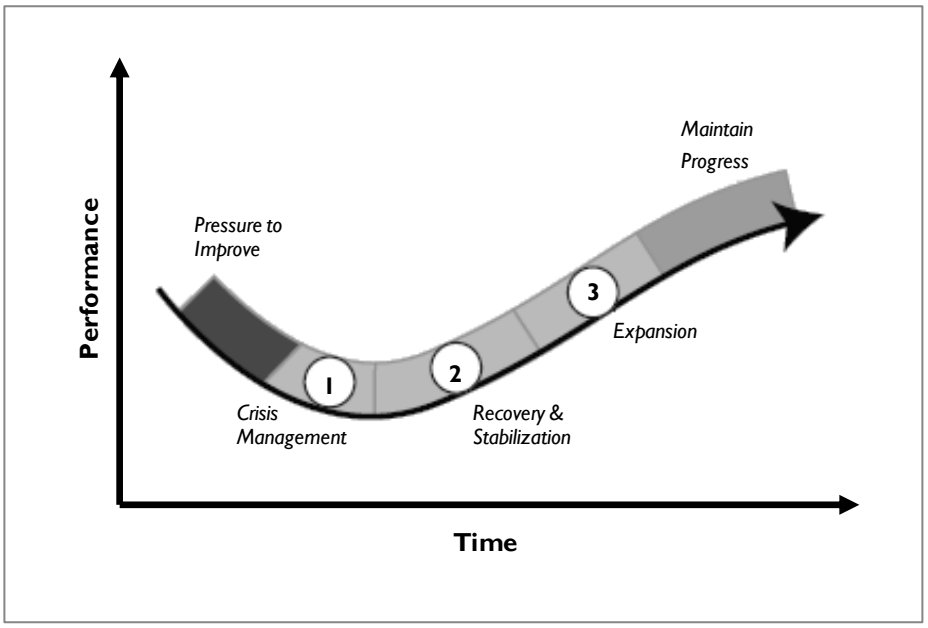

Figure 5-25 Stages of Reform (after van Ginneken and Kingdom, 2008)

The approach for that (World Bank, 2015):

- Having all stakeholders on board from the beginning and throughout the process to support reforms,
- Sequencing the the reforms in a logical order by addressing financial crises at the beginnng "crisis management", follwoed by deeper institutional reforms "recovery and stabilization", and eventual expansion of services "expansion",
- Paying attention to social acceptability of reforms by combining less acceptable reforms with tangible service improvements,
- Focusing on long-term sustainability of the reforms.

Historically, JWU has experienced a steady decline in performance over many years from 2005 to 2011. It reached a critical point in year 2011. That crisis triggered many reforms in the last years. Triggers for reform were mainly financial problems within the utility, and they shaped the initial stages of the reform program. Then, all of the reform actions

described in the previous sections fall in the medium stages of reform towards expansion and maintaing progress. These reform actions would take place concurrently with the other aggregation reforms resulting from the decree delegation of the sanitation services in its service area to JWU.

5.7 Planning Strong Communication Strategy and Selling the Reform Plan

This section is the seventh of seven sections in the Results and Discussion Chapter (Chapter Five). Section one provided the foundation for the study by assessing the Palestinian WSS sector and utility governance and by analyzing the political context in which JWU utility operates. Section Two presented an identification of the stakeholders and their analysis in view of the JWU utility reform. Section Three presented the third building block for reform which involves analyzing JWU with respect to the characteristics of well-performing utilities: autonomy, accountability and market and customer orientation. Section four studied the keys towards JWU's financial sustainability. Section five focused on how to run JWU as a successful utility by employing techniques for ensuring services are efficient and meet consumer needs. It involves assessing JWU's practices for designing good utility systems; operation and maintenance management, comprehensive asset management, non-revenue reduction and emergency management. Section six focused on how reforms should generally be sequenced into logical stages, both to provide space in which to maximize stakeholder buy-in, and to provide opportunities for changes to be evaluated along the way. This section provides for recommendations for the derivation of a communication strategy presents the common trajectory for selling the reform plan.

Communication is essential for successful utility reform and is advantageous to "get ahead" of the debate regarding a new policy or reform. Effective communication with stakeholders creates a sense of urgency, build trust and influence the political will as well as the public. Thereby, the utility can minimizes political risk and avoid delays, increase responsiveness when facing opposition and strengthen credibility of process by keeping actors informed (World Bank, 2015).

JWU needs to generate support among stakeholders, staff, and consumers through a participatory process. The input of the stakeholders can be incorporated into the reform projects so that stakeholders' interests and needs are represented and taken into account. This approach will contribute to better sustainable results.

According to the (World Bank, 2015), to derive a strategic communication strategy, utility should follow the following 10 steps. This applies to the case of JWU as well.

- Understanding stakeholders
- Assessing current communication situation
- Setting clear objectives

- Identifying various stages of behavior (Table 5-20)
- Selecting communication channels
- Customizing messages
- Developing a comprehensive campaign
- Defining an action plan
- Launching the campaign
- Evaluating the campaign and tuning it up

Table 5-20 Which Behavior Stage certain Stakeholder Fit In (after World Bank, 2015)

	Annual Depreciation Percentages (%)
Unaware	Increase stakeholder awareness, concern and knowledge
Aware, concerned, knowledgeable	Stakeholder must understand barriers and benefits of behavior change
Motivated to change	Showcase specific benefits of change end encourage sharing of ideas with peer groups
Tries new behavior	Stakeholder must feel social support for change and in-turn they can convince others
Sustain new behavior	Once convinced about the reform, they can be used even as spokeperson

On the other hand, here are common steps in selling the reform plan as suggested by (World Bank, 2015). They are depicted in the following Figure 5-26. It is a common trajectory of slowly growing support for reforms. As shown, the process of selling reforms begins with the Political Economy Analysis (PEA), and ends with working with the media to build sufficient support to trigger reforms.

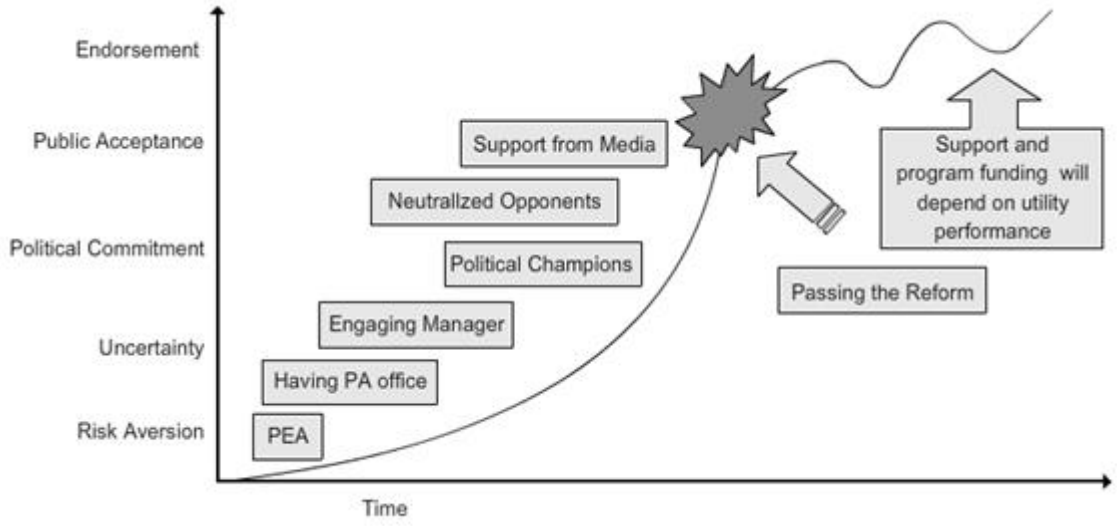

Figure 5-26 Common Steps in Selling a Reform Plan (after World Bank, 2015)

Chapter 6

Conclusions and Recommendations

6.1 Conclusions

1. A comprehensive reform plan addressing governance and regulatory issues at the Palestinian WSS sector level was endorsed by the Cabinet of Ministers in 2009. It is widely supported by the donors. It entailed institutional separation of the regulatory function from the PWA to create an independent regulatory agency, and led to the enactment of a Water Law in mid-2014. The new legal allocation assigns new roles and responsibilities to already existing entities, as well as places a huge burden of new roles and responsibilities on the fledgling institutions.
2. Under the new water law (2014), the PWA is responsible for policy setting and managing all water resources; the regulatory function on service provision including lisencing of service providers and approval of tariffs is entrusted to an independent Water Sector Regulatory Council (WSRC) which was founded in late-2014; and the service provision would be carried out by a National Water Company (NWC), Water Users Associations (WUA) and Regional Water Utilities (RWU). Overall, the implementation of the sector reorganization is relatively progressing at slow pace with complications resulting from the conflicting visions of the PWA, MoLG and WSRC.
3. For the present 280s WSS service providers, aggregation is the policy action selected by the Government as a result of the new water law of 2014 and the sector reform plan legislated in 2009. The planned economies of scales is regional, with four utilities in the north, middle, and south of the West Bank and the coastal one in Gaza. They are expected to be materialized at the medium to long-term.
4. The aggregation processes would vary between the regions and even within the governorates in view of the diversity of the local circumstances especially regarding the existence of a nucleus receiving body (expandable service provider), its current scale, scope, governance and performance, or the need to set-up a new or separate entity.
5. In Jerusalem and Ramallah & Al Bireh governorates, the WSS service providers would fully merge their operation into Jerusalem Water Undertakung (JWU) which would also own and mange the assets.

6. JWU is a multi-municipal [corporatized] water utility established in 1966 that operates under the Regulating Drinking Water Affairs Law in Jerusalem Governorate No. (9). JWU which also owns the assets, supplies potable water to 55 communities, 12 out of 44 localities in Jerusalem Governorate and 43 out of 75 localities in Ramallah & Al Bireh Governorate. Water is also provided by JWU in bulk to 1 municipality (Betunia). At present, JWU does not operate wastewater collection and treatment but this undertaking is afoot. Recently, in 2011, the Cabinet issued a ministerial decree mandating JWU to undertake the management of sanitation services within its jurisdiction area and collect the respective fees. The JWU is supervised by a Board of Directors consisting of seven (7) members. Five (5) members are from the participating municipalities: Ramallah (2 members including the Mayor), Al Bireh (2 members including the Mayor) and Deir Dibwan (1 member); One (1) member form Kufur Malik village; and the remaining member is designated by the Government. The supervisory board's duties include reviewing and approving the budget, work programmes and investment projects, prescribing water tariffs and subscription fees to consumers, and setting the procurement and personnel regulations. The board appoints the General Manager who manages the daily affairs of the undertaking.
7. Persuiant to the above-mentioned ministereal decree issued by the end of 2011, JWU was designated by the stakeholders by PWA, MoLG, the three munucipalities of Ramallah, Al Bireh and Betunia, and the donor the German Government (BMZ) through the KfW Development Bank, to construct, own and manage the shared assets of medium-scale wastewater treatment plant in Betunia. This poject is considered as the trigger for the aggregation reform in the service area of JWU.
8. Considering the policy outcome of the aggregation of centralized management of the scarce water resources, improved coverage and better quality of services, and effective investment strategies, the aggregation process would involve taking over municipal wastewater departments nearby and the other smaller service providers, often underperforming and with significant infrastructure investments.
9. Clearly, it will be rare for the responsibility for providing sanitation services to fall solely on JWU in a once. This fact shall bring the stakeholders in the sector to the stepped approach that the aggregation of sanitation services by JWU must start with the implementation of new wastewater projects in the area with appropriate ways of planning, financing and incentives. Incentive for the utility as whole and incentives for the service providers to join JWU.
10. Undoubtedly, aggregations will be gradual and require time to build support and consensus in the first place, dealing each time with issues related to the transfer of assets, financial arrangments, hman resources, IT systems, and the administrative processes.
11. The suscess of the aggregation process largely depends on the governance and the performance of JWU in the first place. Overall, the utility framework of JWU is with encouraging autonomy, accountability, and market and customer orientation. Hence, sustaining JWU as a well-performing utility is a precondition for the success of the aggregation process.
12. While the diagnostic findings reveal that JWU has the capacity to initiate and absorb change related to the aggregation in terms of scope and scale. Some reform actions

are required for further strengthening JWU in preparation to the aggregation process. The reform actions concerns the external environment of JWU (the relationship between the utility and the environment in which it operates) as well as the internal functioning of the utility towards more balanced accountability framework and improved organizational and finacial management strategies and sustainable management system plans.

13. The role of donors is very important in further advancing JWU as a modern utility and in the aggregation process. Especially that such actions will be undertaken within a broad water sector reform framework to wich they are committed.

6.2 Recommendations

1. Continuing in improving JWU water supply services and consolidating sanitation services under the scope of JWU with gradually expanding its scale with the long term vision of transforming the JWU to a Regional Water Supply and Sanitation Service Provider –the Central Utility.
2. Putting renewed pressure on the financing agencies including the international development banks to adopt a coordinated and innovative approach to financing aid for sanitation investments in the service area of JWU with focusing on long-term sustainability of the investments and by serving the sector and JWU reforms.
3. Providing financing programs in JWU service area as incentives for aggregations and helping achieving performance gains.
4. Coordinating the financing and the implementation of the WSS investments in the service area of JWU in line with the regional water suply and sanitation master plans prepared by JWU recently in cooperation with the relevant stakeholders in the sector.
5. Securing financing programs to upgrade the JWU network sytem to support the set out of the aggegated JWU that will provide water and sanitation services to the central area.
6. Setting priority order according to a preset criteria for joining JWU that will take into consideration netwok condition, population, and the water source of each locality.
7. Having all stakeholders on board from the beginning and throughout the process to support JWU reforms, generate ownership, build consensus, and respnd to opponents.
8. Sequencing the reforms in a logical order by addressing financial crises at the beginnng, followed by deeper institutional reforms and eventual expansion of services.
9. Paying attention to social acceptability of reforms by combining less acceptable reforms with tangible service improvements.

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WEBSITES ACCESSED DURING THE RESEARCH

DFID	https://www.gov.uk/government/organisations/department-for-international-development
JWU	https://www.jwu.org/
PCBS	http://www.pcbs.gov.ps/
PWA	http://www.pwa.ps/
UN	https://www.un.org/
WHO	http://www.who.int/
World Bank	http://www.worldbank.org/
WSRC	https://www.wsrc.ps/

Annexes

Annex I Population in the Governorates of Jerusalem and Ramallah & Al Bireh by Locality and the Localities Covered by Present JWU Area (developed by the researcher based on PCBS database, 2015 and JWU, 2015)

Annex 1A Localities Covered by Present JWU Area in Jerusalem Governorate developed by the researcher based on PCBS database, 2015 and JWU, 2015)

No.	*Governoate*	*Locality Name*	*Locality code*	*Locality Type**	*Population 2015*	*Source of Water*	*Existing Distribution Zones Inside Locality (JWU Number)*
1	Jerusalem	Rafat	401870	2	2,727	JWU	57
2	Jerusalem	Mikhmas	401885	2	1,662	JWU	63
3	Jerusalem	Qalandiya Camp	401900	3	10,144	JWU	18
4	Jerusalem	Qalandiya	401915	2	1,354	JWU	47
5	Jerusalem	Beit Duqqu	401930	2	1,862	+	
6	Jerusalem	Jaba'	401935	2	3,656	JWU	50
7	Jerusalem	Al Judeira	401940	2	2,614	JWU	49
8	Jerusalem	Ar Ram & Dahiyat al Barid	401945	1	23,386	JWU	37,39,40,41,42,43,44,45
9	Jerusalem	Beit 'Anan	401950	2	4,572	+	
10	Jerusalem	Al Jib	401955	1	4,847	+	
11	Jerusalem	Bir Nabala	401960	1	5,533	JWU	28
12	Jerusalem	Beit Ijza	401965	2	802	+	
13	Jerusalem	Al Qubeiba	401980	2	3,644	+	
14	Jerusalem	Kharayib Umm al Lahim	401985	2	417	+	
15	Jerusalem	Biddu	401995	1	7,809	+	
16	Jerusalem	An Nabi Samwil	402000	2	296	+	
17	Jerusalem	Hizma	402005	1	7,203	JWU	52
18	Jerusalem	Beit Hanina al Balad	402010	2	1,230	JWU	79
19	Jerusalem	Qatanna	402015	2	7,418	+	
20	Jerusalem	Beit Surik	402020	2	4,465	+	
21	Jerusalem	Beit Iksa	402025	2	2,177	+	
22	Jerusalem	'Anata	402040	1	13,840	+	
23	Jerusalem	Al Ka'abina (Tajammu' Badawi)	402045	2	797	+	
24	Jerusalem	Az Za'ayyem	402065	2	3,908	+	
25	Jerusalem	Al 'Eizariya	402100	1	20,223	+	
26	Jerusalem	Abu Dis	402120	1	12,385	+	
27	Jerusalem	'Arab al Jahalin	402125	2	828	+	
28	Jerusalem	As Sawahira ash Sharqiy	402145	1	6,662	+	
29	Jerusalem	Ash Sheikh Sa'd	402160	2	2,239	+	
30	Jerusalem	Other Localities		2	83	+	
31	Jerusalem	Beit Hanina	401990	-	**	JWU	19,20
32	Jerusalem	Shu'fat Camp	402030	-	**	+	
33	Jerusalem	Shu'fat	402035	-	**	+	
34	Jerusalem	Al 'Isawiya	402050	-	**	+	
35	Jerusalem	(Al Quds)Jerusalem	402090	-	**	+	
36	Jerusalem	Silwan	402110	-	**	+	
37	Jerusalem	Ath Thuri	402115	-	**	+	
38	Jerusalem	Jabal al Mukabbir	402130	-	**	+	
39	Jerusalem	As Sawahira al Gharbiya	402135	-	**	+	
40	Jerusalem	Beit Safafa	402140	-	**	+	
41	Jerusalem	Sharafat	402150	-	**	+	
42	Jerusalem	Sur Bahir	402155	-	**	+	
43	Jerusalem	Umm Tuba	402165	-	**	+	
44	Jerusalem	Kafr 'Aqab	401875	-	**	JWU	38
		Urban Total	150,297		362,213	86.4%	
		Rural Total			46,751	11.2%	
		Camps Total			10,144	2.4%	
		Total Jerusalem J2			158,783		
		Total Jerusalem J1			260,324		
		Total Jerusalem Gov.			419,108		
		JWU Present Area			59,509		

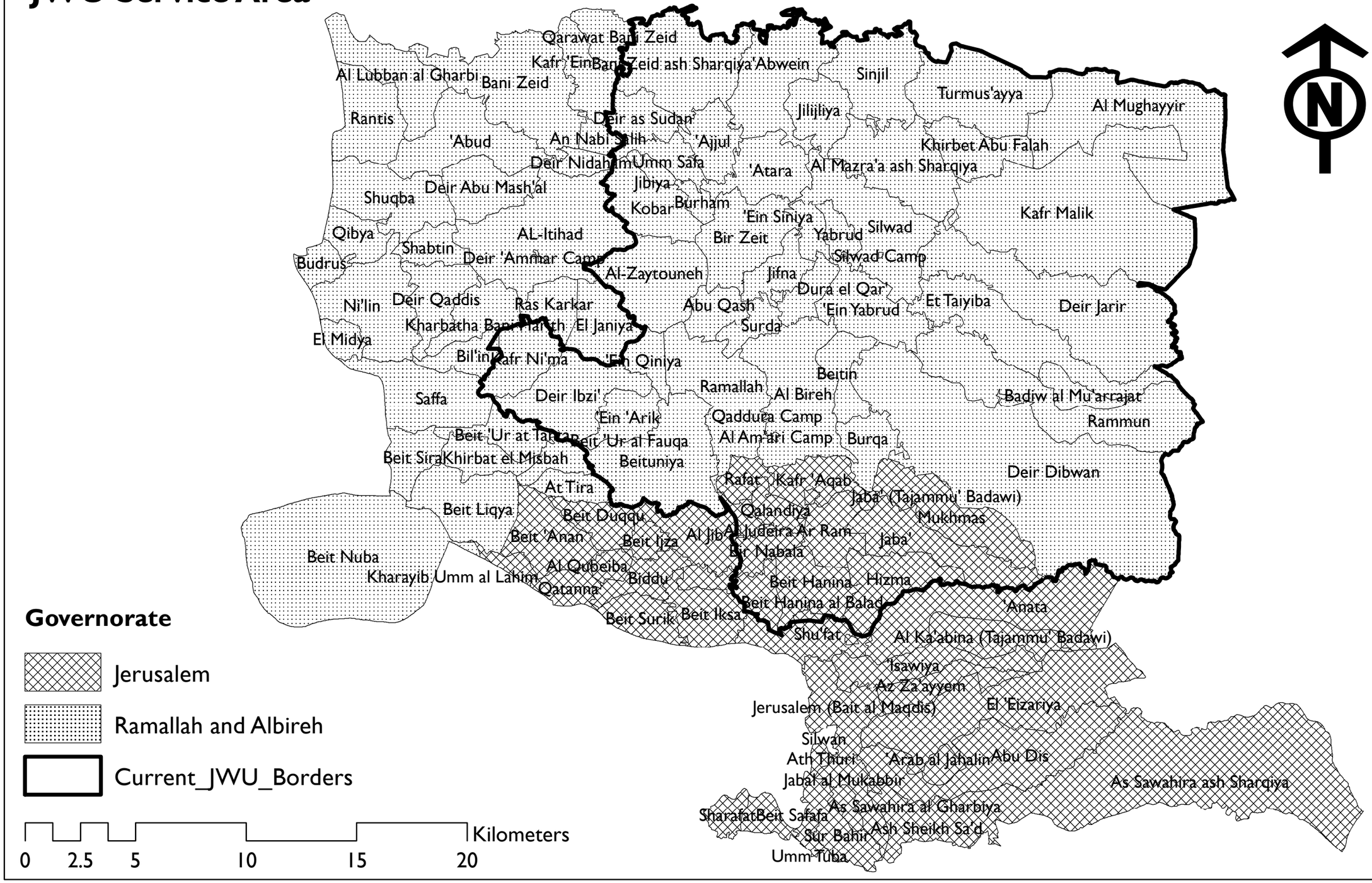
* Locality Type: 1- Urban 2- Rural 3- Camps

Annex 1B Localities Covered by Present JWU Area in Ramallah & Al Bireh Governorate (developed by the researcher based on PCBS database, 2015 and JWU, 2015)

No.	*Governoate*	*Locality Name*	*Locality code*	*Locality Type**	*Population 2015*	*Source of Water*	*Existing Distribution Zones Inside Locality (JWU Number)*
1	Ramallah & Al Bireh	Qarawat Bani Zeid	301455	2	3,628	+	
2	Ramallah & Al Bireh	Bani Zeid ash Sharqiya	301460	1	6,326	JWU	67,68
3	Ramallah & Al Bireh	Kafr 'Ein	301470	2	2,169	+	
4	Ramallah & Al Bireh	Bani Zeid	301480	1	6,863	+	
5	Ramallah & Al Bireh	'Abwein	301485	2	3,881	JWU	66
6	Ramallah & Al Bireh	Turmus'ayya	301490	2	4,649	JWU	60
7	Ramallah & Al Bireh	Al Lubban al Gharbi	301495	2	1,837	+	
8	Ramallah & Al Bireh	Sinjil	301500	1	6,516	JWU	59
9	Ramallah & Al Bireh	Deir as Sudan	301505	2	2,478	JWU	75
10	Ramallah & Al Bireh	Rantis	301515	2	3,153	+	
11	Ramallah & Al Bireh	Jilijliya	301520	2	922	JWU	65
12	Ramallah & Al Bireh	'Ajjul	301525	2	1,539	JWU	76
13	Ramallah & Al Bireh	Al Mughayyir	301530	2	2,947	JWU	77
14	Ramallah & Al Bireh	'Abud	301535	2	2,593	+	
15	Ramallah & Al Bireh	An Nabi Salih	301540	2	665	+	
16	Ramallah & Al Bireh	Khirbet Abu Falah	301545	2	4,973	JWU	61
17	Ramallah & Al Bireh	Umm Safa	301550	2	762	JWU	62
18	Ramallah & Al Bireh	Al Mazra'a ash Sharqiya	301555	1	5,594	JWU	55
19	Ramallah & Al Bireh	Deir Nidham	301560	2	1,094	+	
20	Ramallah & Al Bireh	'Atara	301565	2	2,825	JWU	46
21	Ramallah & Al Bireh	Deir Abu Mash'al	301570	2	4,383	+	
22	Ramallah & Al Bireh	Jibiya	301575	2	184	JWU	54
23	Ramallah & Al Bireh	Burham	301585	2	767	JWU	51
24	Ramallah & Al Bireh	Kafr Malik	301590	2	3,468	JWU	29
25	Ramallah & Al Bireh	Shuqba	301595	2	5,596	+	
26	Ramallah & Al Bireh	Kobar	301600	2	4,576	JWU	71
27	Ramallah & Al Bireh	Qibya	301605	2	6,099	+	
28	Ramallah & Al Bireh	Silwad	301610	1	7,620	JWU	27
29	Ramallah & Al Bireh	Yabrud	301615	2	801	JWU	33
30	Ramallah & Al Bireh	AL-Itihad	301620	1	8,466	+	
31	Ramallah & Al Bireh	Shabtin	301625	2	1,050	+	
32	Ramallah & Al Bireh	Bir Zeit	301635	1	5,636	JWU	80
33	Ramallah & Al Bireh	'Ein Siniya	301640	2	885	JWU	34
34	Ramallah & Al Bireh	Silwad Camp	301645	3	475	JWU	9
35	Ramallah & Al Bireh	Deir Jarir	301650	2	4,960	JWU	24
36	Ramallah & Al Bireh	Deir 'Ammar Camp	301660	3	2,282	+	
37	Ramallah & Al Bireh	Budrus	301665	2	1,741	+	
38	Ramallah & Al Bireh	AL-Zaytouneh	301670	2	7,703	JWU	69,70
39	Ramallah & Al Bireh	Jifna	301675	2	2,135	JWU	31
40	Ramallah & Al Bireh	Dura al Qar'	301680	2	3,605	JWU	58
41	Ramallah & Al Bireh	At Tayba	301685	2	1,807	JWU	25
42	Ramallah & Al Bireh	Al Jalazun Camp	301700	3	9,723	JWU	56
43	Ramallah & Al Bireh	Abu Qash	301705	2	1,747	JWU	53
44	Ramallah & Al Bireh	Deir Qaddis	301710	2	2,417	+	
45	Ramallah & Al Bireh	Ni'lin	301715	1	5,691	+	
46	Ramallah & Al Bireh	'Ein Yabrud	301720	2	3,732	JWU	30
47	Ramallah & Al Bireh	Kharbatha Bani Harith	301725	2	3,542	+	
48	Ramallah & Al Bireh	Ras Karkar	301730	2	2,070	+	
49	Ramallah & Al Bireh	Surda	301735	2	1,283	JWU	48
50	Ramallah & Al Bireh	Al Janiya	301740	2	1,447	+	
51	Ramallah & Al Bireh	Al Midya	301745	2	1,619	+	
52	Ramallah & Al Bireh	Rammun	301750	2	3,268	JWU	26
53	Ramallah & Al Bireh	Kafr Ni'ma	301755	2	4,667	JWU	74
54	Ramallah & Al Bireh	Bil'in	301760	2	2,117	+	
55	Ramallah & Al Bireh	Beitin	301765	2	2,667	JWU	23
56	Ramallah & Al Bireh	'Ein Qiniya	301770	2	1,010	JWU	78
57	Ramallah & Al Bireh	Badiw al Mu'arrajat	301775	2	937	+	
58	Ramallah & Al Bireh	Deir Ibzi'	301780	2	2,575	JWU	73
59	Ramallah & Al Bireh	Deir Dibwan	301785	1	6,536	JWU	02,22
60	Ramallah & Al Bireh	Al Bireh	301790	1	47,540	JWU	04,10,14,15,16,32,35
61	Ramallah & Al Bireh	'Ein 'Arik	301800	2	1,950	JWU	72
62	Ramallah & Al Bireh	Saffa	301805	2	4,731	+	
63	Ramallah & Al Bireh	Ramallah	301810	1	34,173	JWU	01,11,12,13,17
64	Ramallah & Al Bireh	Burqa	301815	2	2,601	JWU	64
65	Ramallah & Al Bireh	Beit 'Ur at Tahta	301820	1	5,441	+	
66	Ramallah & Al Bireh	Beituniya	301825	1	24,592	JWU (Bulk)	
67	Ramallah & Al Bireh	Al Am'ari Camp	301830	3	6,240	JWU	21
68	Ramallah & Al Bireh	Qaddura Camp	301835	3	1,503	JWU	8
69	Ramallah & Al Bireh	Beit Sira	301850	2	3,421	+	
70	Ramallah & Al Bireh	Kharbatha al Misbah	301855	2	6,485	+	
71	Ramallah & Al Bireh	Beit 'Ur al Fauqa	301860	2	1,075	+	
72	Ramallah & Al Bireh	At Tira	301890	2	1,690	+	
73	Ramallah & Al Bireh	Beit Liqya	301895	1	9,595	+	
74	Ramallah & Al Bireh	Beit Nuba	301925	2	310	+	
75	Ramallah & Al Bireh	Other Localities		2	62	+	
		Urban Total			180,587	51.9%	
		Rural Total			147,299	42.3%	
		Camps Total			20,224	5.8%	
		Total Ramallah & Al-Bireh			348,110		

'* Locality Type: 1- Urban 2- Rural 3- Camps

JWU Service Area



Annex 2 Summary of the Assessment of the Governance of JWU (developed by the researcher)

Functioning of the JWU Utility	*Process Benchmarking*					
	Yes	*No*	*Rating*			*Main Report*
			Good	*Fair*	*Poor*	*Ref.*
Mandate						
Permanent delegation agreement or bylaws						
Short term performance agreement						
Dispute resolution Government /Provider						
Incorporation and Shareholding						
Obligation of ring-fencing						
Obligation of Incorporation						
Ownership of shares						
Distribution of dividends						
Board of Directors						
Appointment criteria						
Selection of chairperson						
Frequency of meetings and agenda						
Compensation						
Code of conduct						
Actual capacity to guide management						
Management Team						
Appointment by BOD						
Competitive recruitment						
Competitive compensation package						
Transparence of Selection						
Performance targets in contract						
Interaction with BOD						
Staff						
Management freedom to right size						
Competitive recruitment						
Competitive compensation package						
Transparence of selection						
Existence of trade unions						
Performance evaluation						
Promotion made on merit						
Absenteeism						
Training Budget						
Training budget						
Adequacy of training programs						
Universities						
Training centers						
Professional association						
Certification process						
Financial management						
Corporate accounting						
Internal accounting procedures						
Adequacy of						
Staff						

Continued

Functioning of the JWU Utility	*Process Benchmarking*					
	Yes	*No*	*Rating*			*Main Report Ref.*
			Good	*Fair*	*Poor*	
Hardware						
Software						
Existence of ceilings for procurement						
Independent audits						
Capacity to address audit qualifications						
Corporate Culture						
Existence of a mission statement						
Adequacy of internal communication						
Existence of procedures						
Existence of quality control						
Application to ISO certification						
Membership of professional associations						
Reporting						
Obligations to report to regulator						