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Institutional Model for Managing Water Sector in the V
Bank / Palestine.

By :

Sand Mohammad Salhout

M.B.A Thesis

Jerusalem –Palestine

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Institutional Model for Managing Water Sector in the West Bank / Palesti

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Dedication

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To:

The soul of my Father

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Declaration:

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I certify that this thesis submitted for the degree of Master is the result of own research, except where otherwise acknowledged, and that this thesis part of the same) has not been submitted for a higher degree to any other university or institution.

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Acknowledgments

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Abstract

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This study was carried out in the period between September 2006 and June 2007 to a institutional performance of water institutions in the West Bank, using structural perf criteria. Five water utilities and municipalities were taken as a sample: T Municipality, Anabta Municipality, Jericho Municipality, the Jerusalem Water Unc (Ramallah) and the Water Supply and Sewerage Authority (Bethlehem). In stakeholders' attitudes towards and opinions of the institutional performance o institutions was examined.

The main objective of this study was to assess and evaluate the current inst performance of a number of water institutions in the West Bank, within a nu frameworks, including the regulation framework, the technical framework, the ma framework, the financial framework and the management information system framew aim was to identify an optimum institutional model for managing water resources, in to testing whether the recently approved institutional model (approved by the Cc Ministries, Decision No.5, 2006) could be applied based on the analysis of this resear

This study is the first to focus on evaluating the institutional performance of a nu water institutions in the West Bank and identifying the major strengths and weakr these institutions in order to recommend the optimum model for managing water reso

The methodology used in this study was based upon an analytical framework. Field studies were carried out. Real secondary data were collected and analyzed within frameworks mentioned above.

Stakeholders' attitudes, responses and opinions were also assessed through a specially designed questionnaire. This questionnaire was distributed to a targeted sample of 100 people working in the water sector, especially water utility representatives, municipal representatives, academics and researchers, in addition to a number of professionals in non-governmental organizations specialized in the water sector. Eighty-one questionnaires were collected and analyzed using the SPSS statistical package.

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The most important findings of this research were the striking parallels between the results of the case studies and the questionnaire, increasing the relevance of this research by underscoring the fact that water institutions working in the West Bank face many problems and shortcomings which should not be ignored. These shortcomings include low cost efficiency, high water losses, high accumulated debts, high salaries for water department staff, lack of coordination channels between different stakeholders, lack of managerial systems and frameworks, in addition to the contradictory tariff system.

This study shows that the new institutional model that was approved recently by the Council of Ministers, (Decision No.5, 2006) and that is supposed to divide the West Bank into three main regions (North, Central, South) can not be applied for a number of reasons. Among these reasons are the inappropriate time, the lack of assessment and evaluation of water institutions, the absence of executive authority and the deficient performance of existing water utilities. In order to apply a new institutional model for managing water resources it is necessary to carry out a reevaluation of the institutional performance of water institutions from all points of view. This will allow for the identification of the major weaknesses, strengths, opportunities and threats that face water institutions. This is preferable to developing a new model that does not elicit response and cooperation from water utilities and municipalities.

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Based on the analysis of this research, the Public-Private Partnership model was identified as the potential and optimum model for managing water resources in the West Bank in an efficient and sustainable manner.

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ملخص

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رأسة التي تمت في الفترة ما بين أيلول / 2006 إلى حزيران / 2007 تم بحث فاعلية الأداء المؤسسي إدارة مصادر المياه الفلسطينية في الضفة الغربية من خلال حالات دراسية (بلدية طولكرم، بلدية عنبتا، مصالحة مياه رام الله، ومصالحة مياه ومجاري بيت لحم) واستطلاع توجهات وآراء عينة مختارة من مهتمين في قطاع المياه. هدفت الدراسة إلى تقييم وضع بعض مؤسسات المياه والبلديات الموجودة في بيئة من النواحي: القانونية، الفنية، الإدارية، المالية، وإدارة المعلومات) واستنتاج النموذج المؤسسي لقطاع المياه في الضفة الغربية. هذا بالإضافة إلى دراسة وفحص مدى مواءمة وإمكانية تطبيق مؤسسي الجديد والمقترح لإدارة قطاع المياه والذي تم إقراره حديثاً (2006) من قبل مجلس الوزراء والمقدم حالياً للإقرار في المجلس التشريعي. تعتبر هذه الدراسة الأولى من نوعها في الوطن والتي مة وضع مؤسسات المياه وعدد من البلديات العاملة في قطاع المياه في الضفة الغربية وفحص إطن الضعف والقوة في أداء هذه المؤسسات والتوصية بالنموذج المؤسسي الذي قد يكون الأمثل لإدارة .:

بحث الذي استخدم في هذه الدراسة انقسم إلى جزأين: الأول، دراسة حالات عملية من خلال زيارات لبلديات والمؤسسات آنفة الذكر من خلال مقابلة المسؤولين والموظفين في هذه المؤسسات بالإضافة إلى لثانوية المتعلقة بالأداء القانوني، الفني، المالي، الإداري وإدارة المعلومات). ثانياً، استبيان آراء مهتمين (Stakeholders) في قطاع المياه بتوزيع استبانة تكونت من اثنين وستين (62) سؤالاً تم على مائة (100) مبحوث شملتهم عينة الدراسة التي كانت عينة مختارة من الأشخاص المختصين فقط وعلى رأسهم رؤساء المؤسسات والبلديات بالإضافة إلى عدد من ممثلي المؤسسات غير الحكومية قطاع المياه والمؤسسات الحكومية وعدد من الأكاديميين والدارسين . وقد أمكن استرجاع إحدى (8) استمارة وتحليلها إحصائياً باستخدام رزمة التحليل الإحصائي SPSS.

هذه الدراسة توافقاً وتناسقاً شبه كامل بين مخرجات ودلالات الحالات المدروسة والتحليل الإحصائي بينة المختارة مما يزيد من مصداقية استنتاجات الدراسة وما خلصت إليه بأن الترتيب المؤسسي الحالي له يعاني من مشاكل حقيقية يجب عدم إغفالها أو تجاهلها، ومن هذه المشاكل: ضعف الأداء القانوني، اري والمالي. وكذلك بينت هذه الدراسة أن قطاع المياه في فلسطين يعاني من عدة معيقات أدى إضعاف الترتيب المؤسسي لإدارة هذا القطاع بصورة كفوة بالإضافة إلى هدر الموارد المالية ، ومن هذه المعيقات: ضعف الأداء الفني للمؤسسات العاملة في قطاع المياه وعلى رأسها البلديات المياه الأخرى، ارتفاع نسبة الفاقد من المياه، ضعف كفاءة تحصيل مستحقات المياه من الجمهور، الديون المتركمة، ضعف الأداء الإداري والهيكلية لهذه المؤسسات بالإضافة إلى عدم توفر قنوات هذه المؤسسات و سلطة المياه الفلسطينية التي على رأس هذه المؤسسات. وتتنبأ هذه الدراسة بعدم يبق الترتيب المؤسسي الجديد (تقسيم الضفة الغربية إلى ثلاث مناطق خدمة: شمال ووسط وجنوب) حديثاً من قبل مجلس الوزراء الفلسطيني "قرار رقم 5 عام 2006 " لعدة اعتبارات مهمة منها عدم قدرة لمياه الحالية على إدارة قطاع المياه وهي ليست بأفضل حالاً من البلديات الأخرى. وأيضاً من شأن هذا ذي ما زال قيد المصادقة عليه) هدر الموارد المالية والإنسانية و رفع أسعار المياه بالإضافة إلى عدم نيات مع قرارات سلطة المياه خاصة تلك البلديات التي يتوفر لديها مصادر خاصة للمياه . ولاعتماد سي جديد لا بد من إعادة تقييم الوضع المؤسسي الحالي وإيجاد مواطن الضعف والقوة في مؤسسات مع الأسس السليمة لحلها عوضاً عن خلق وتأسيس مؤسسات جديدة قد لا تلقى تجاوباً وتعاوناً من صالح المياه. وبناءً على معطيات ونتائج هذه الدراسة فقد استنتج أن النموذج المؤسسي الممكن طبيقه لإدارة قطاع المياه الفلسطيني هو الشراكة بين القطاعين العام والخاص ضمن إطار مؤسساتي إضح ومدروس لضمان إدارة قطاع المياه بصورة سليمة تضمن الكفاءة والاستمرارية.

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Abbreviation and Units

Abbreviation:

PWA	Palestinian Water Authority
WBWD	West Bank Water Department
WSSA	Water Supply and Sewage Autho
UNEP	United Nations Environment Pro,
WHO	World Health Organization
GTZ	German Technical Organization
NWC	National Water Council

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Units:

L	Liter
M	Meter
MCM/yr	Million Cubic Meter per yr
L/c/d	Liter per Capita per Day
m ³	Cubic Meter

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Chapter- 1-

1.1 Introduction

Water is an environmental resource with a profound impact on public health, economic activity and environmental (and ecosystem) quality. Therefore, the prerequisite for any sustainable development is that organizations that are mandated with water management actually possess the capability to carry out their tasks. A well-balanced arrangement of flexible, dynamic, well-structured organizations, and other related institutions are the best assurance that water resources remain available in the future and that the appropriate quantity and quality of water are delivered to the users. These organizations, however, can only execute their functions if they have access to an appropriate financial, political, and economic base to expand and maintain the infrastructure, to attract qualified professionals funds, and to prepare well for the future (WHO, UNEP, 1997).

In response to the growing water crisis, a new global consensus on managing water resources has emerged in recent years, which is institutional management. At its core are two fundamental principles:

□ **The instrument:** water has an economic value in all its competing uses and should be recognized as an economic good. Managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation and protection of water resources (Nickson, 2000).

□ **The institutional:** water management should be based on a participatory approach involving users, planners and policy-makers at all levels, with decision-making taken at the appropriate level according to the concept of subsidiary (Nickson, 2000).

Palestine is a developing country but it finds itself in a unique situation because of the Israeli occupation and the Israeli control of Palestinian resources including water. Water resources in Palestine are in short supply, while consumption for water is growing. The Israeli company Mekorot controls about 53% of water resources. The remaining 47% are provided by local Palestinian sources as presented in table1.1.

Table 1.1 Total local and purchased water "Water Supply "(Million Cubic Meter)

No	Governorate	Population	Local Water Resources (MCM)	Purchased Resources (MCM)	Total (MCM) Resources	Supply Rate (l/c/d)
1	Jenin	248.2	2.181	2.052	4.233	47
2	Tubas	45.4	0.596	0.12	0.716	43
3	Tulkarem	164	5.031	0.265	5.296	88
4	Nablus	319.5	7.195	2.244	9.439	81
5	Qalqilya	91.1	3.658	0.335	3.993	120
6	Salfit	60.4	0.228	1.299	1.527	69
7	Jerico	41.1	1.308	1.042	2.35	157
8	Ramallah	270.9	2.192	8.668	10.86	110
9	Jerusalem	145.4	0.062	7.025	7.087	134
10	Bethlehem	170	2.599	5.162	7.761	125
11	Hebron	507.6	3.661	7.831	11.492	62
Total		2063.6	28.711	36.043	64.754	86

* Source: PWA,2003

The high percentage of dependency on Mekorot in addition to the weak technical performance of water institutions leads to a water supply deficit, as presented in table 1.2.

Table 1.2 Water Supply and Demand in the West Bank (2003)

Governorate	Total Population in thousands	Supply Rate (L/c.d)	Required Quantities (MCM)	Available Quantities	Deficit (MCM)
Jenin	248.2	47	13.592	4.233	9.359
Tubas	45.4	43	2.483	0.716	1.767
Tulkarem	164	88	8.98	5.296	3.684
Nablus	319.5	81	17.49	9.439	8.051
Qalqilya	91.1	120	4.986	3.993	0.993
Salfit	60.4	69	3.305	1.527	1.778
Jericho	41.1	157	2.247	2.35	0
Ramallah	270.9	110	14.829	10.86	3.969
Jerusalem	145.4	134	7.96	7.087	0.873
Bethlehem	170	125	9.305	7.761	1.544
Hebron	507.6	62	27.792	11.492	16.3
Total	2063.6	86	112.969	64.754	48.318

* Source: PWA, 2003

Given this situation, the question of the optimal management of water resources is clearly of crucial importance, with implications not only for the future development, but also for the sustainability of past economic and social achievements (ESCWA, 2003).

Today, Palestine faces a water crisis that is growing more acute over time. It is imperative for policy makers to adopt realistic policies and institutional arrangements that will enable them to regulate demand for water, apportion the available quantities along economically efficient lines, and ensure that water is used more efficiently in various sectors (ESCWA, 2003).

The term "institutional arrangements", as used in this study, denotes the full range of official laws, systems, standards, rules and mechanisms, in addition to unofficial or popular rules and mechanisms, including customary practices, that are applied by governments to formulate and implement their water-related policies.

Before discussing the role of **institutions** and **organizations** in water resources control activities, it is necessary to distinguish between them and to recognize that the function of all institutional factors goes well beyond the boundaries of the common, typical "sector organizations".

Institutions are defined as the "rules" in any kind of social structure, i.e. the laws, regulations and their enforcement, agreements and procedures.(The Palestinian Water Authority is an example).

Organizations are particular types of institution and are composed of groups of people with a common objective. Organizations can be formalized, such as "official" sector organizations with operational objectives, their own budget and professional staff (such as Water Departments, Municipalities) or they can be informal and less well defined (such as "the public", the "customers" who pay for a water service, the socio-economic distinct groups in a village or town community) (Nickson,2000).

Successful implementation of a government policy for water control primarily depends on the suitability of the chosen institutional arrangement. Other factors are also important, such as availability of capital, technology and human resources (expertise). Generally, however, the maximum benefit can only be generated from available resources by an "optimum" institutional arrangement that makes the resources work effectively for the sub-sector.

Good institutional arrangements are essential to develop resources further; for example to make more finance available by increasing the willingness of customers and citizens to pay for water services or to educate and train the professional staff. However, the institutional water sector can only prepare and manage its programs properly if all institutions are appropriately involved in the three main phases: planning; implementation (construction) and operation; and maintenance linked with cost recovery. Although this is normal for formal organizations such as government departments, it is also true for all other institutions that are indirectly implicated and will affect the water supply in one way or another (WHO/UNEP, 1997).

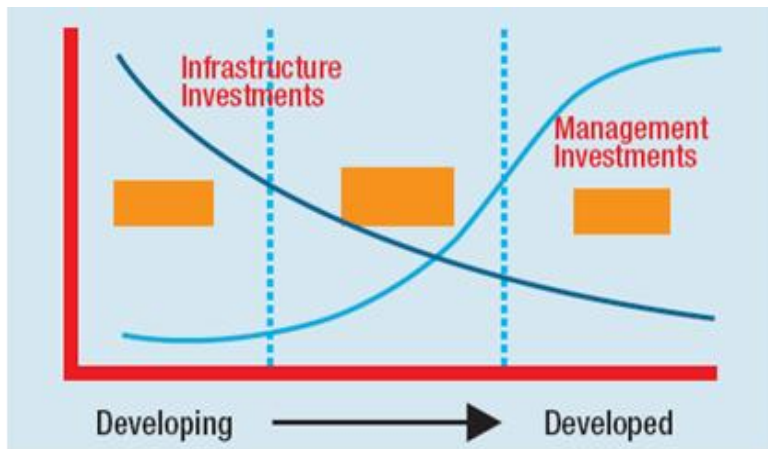
Managing water supply depends on three components, first the availability of water which includes aquifer systems, secondly the availability of infrastructure such as groundwater wells and networks, and finally functional institutions with wide responsibility, including water pricing, distribution and regulations.

Investment in rehabilitating the water sector is not an easy task because it requires significant capital investment and it depends on other factors such as¹¹ availability of water, demand rate for customers and other sectors, and available infrastructure.

As a general rule, developed countries concentrate their efforts on management investments, while developing countries concentrate their efforts on infrastructure investment, such as building and rehabilitating networks. In addition, they tend to ignore urban areas, which leads to a developmental gap between cities and villages (Figure 1.1) (ESCWA, 2003).

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**Source (WWF4, 2006)

Figure 1.1 Investment distributions for water sector in developing and developed countries

The institutional water sector in Palestine has many shortcomings, such as failure to meet customer demand, due to which many villages face severe water crises; accumulated debts and often poor quality of water; large number of employees; and high salaries, especially for upper level management. On the other hand, water organizations have different structures, different kinds of services, different tariff systems, in addition to high percentages of water losses. In the meantime water sector institutions are unable to accomplish full cost recovery; in the best cases they recover operational costs, but fail to provide a reserve for depreciation, emergency needs, cost recovery criteria or awareness campaigns (PWA, 2002).

This study will evaluate the availability and the applicability of the theoretical principles of a number of water institutions in the West Bank and identify other models for institutional management. It will also examine whether the new model of water institutions which was recently approved by the PWA (Decision No-5 of 2006) is applicable, and, if not, what would be an appropriate model.

1.2 Problem Statement

As a result of the Israeli occupation, Palestine has a unique political situation in which the water sector is administered by two different management systems. The first is the Israeli state water company Mekorot and the Israeli government which control water supply and decision making, and place restrictions on maintenance and the drilling of new wells. The second is the Palestinian management which is responsible for water resources management including water supply, demand, charging fees, and other low level management.

The water sector also faces many limitations because of the fragmentation between the different water units and institutions. In local municipalities in particular personal interest and control of the water sector plays an important role; water management is considered to be a cash-generating sector through which all services offered by the municipality, and will never recommend to share these profits with other parties like the private sector (PWA, personal interview).

On the other hand, municipalities and water departments charge different prices according to their own financial and managerial status. This leads to desperation and inconsistency among water institutions.

In reality, the current structure of the institutional water sector in Palestine forms an impediment to achieving effective and sustainable water resources management. At the national level, fragmentation within the water sector and inadequate water resources legislation, policy and planning is common. At the administrative level, the human and financial resources to conduct water resources assessment and monitoring are often unsatisfactory, while there is also insufficient community awareness and participation.

The fragmentation and lack of homogeneity in the activities and institutional levels within the water sector in the West Bank has led to the development of various organizational structures. This in turn created a limitation in the water supply in terms of quality, quantity and price. In addition, this fragmentation leads to a decrease in possible foreign financial investments, and absence of a single strong managerial framework. The main problem can be summarized as below in table 1.3

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Table 1.3 (SWOT) Analysis of water institutions in the West Bank

Strengths	<ul style="list-style-type: none"> • Could be a profit service providers • Available water resources for a number of utilities • Availability of infrastructure • Available human resources which are ready to take training and development courses. • Ability to collect more money • Ability to raise foreign donations
Weaknesses	<ul style="list-style-type: none"> • Weak organizational structures. • Lack of updated rules and regulations. • Absence of management information system • Absence of financial system • Weak financial resources • Lack of coordination with other municipalities • Lack of coordination with PWA • Hiring extra labor • Lack of qualified personnel • Lack of improvement plans that prioritize necessary network improvement • Old metering system
Opportunities	<ul style="list-style-type: none"> • Enhance training needs • Human resources development • Enhance independency of water departments • Enhance water resources management • Penalize customer who fail to pay
Threats	<ul style="list-style-type: none"> • High energy costs • High personnel costs • Dependency on Mekorot (about 53% of water resources are provided by Mekorot). • High water losses, ranging between 23-55% • High accumulated debts. • Inefficient water tariffs • Unreliable water availability • Low collection efficiency

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1.3 Justification of the study

The weak management of the water sector and the lack of homogeneity in the structure of the various water institutions (in terms of number of employees, salaries, type of services) have far-reaching consequences. such as adapting partial and uncompleted managerial models, which leads

to rise the water cost and as a result raising the charges that should be paid by consumers. It also leads to a lack of coordination, fragmentation, duplication of work, lack of quality control, lack of power to implement regulations, and inefficiency of organizational structures of institutions working in water sector. Although the PWA was established as a regulator and overall supervisor of water resources management in 1995, none of these problems has been solved in the past 12 years (1995-2007).

Decision makers in the Palestinian water sector are aware of the above mentioned problems and have suggested a new model for water resources management, which they hope can provide a solution to the current problems. Figure 1.2 represents the suggested institutional model for the coming period, (approved by the Council of Ministries, Decision Number 5.2006).

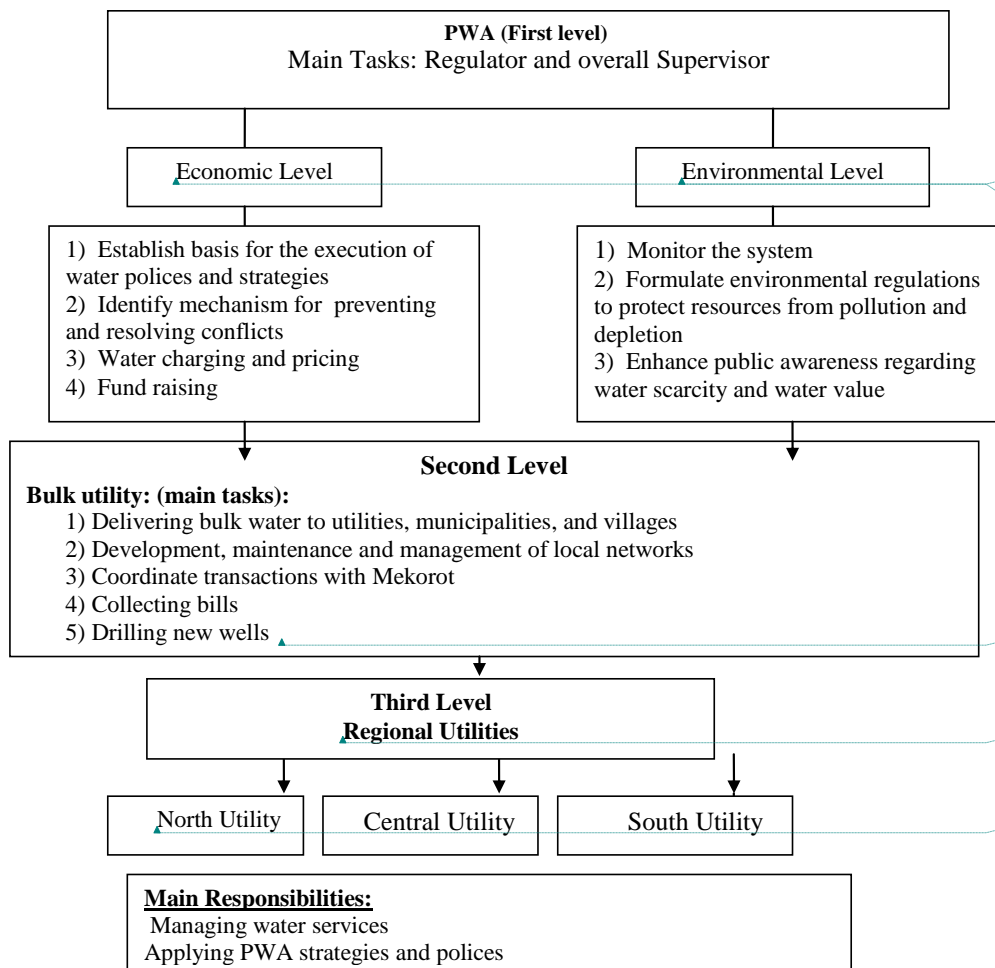


Figure 1.2 Suggested institutional water structure

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It should be noted that this institutional structure, which was drawn up and approved by the Council of Ministries, Decision No.5.2006, could not be applied for the following reasons :

1) This framework was approved before conducting in-depth financial, administrative and economic assessments and evaluations for water utilities and municipalities. The decision makers did not carry out these assessments in order to explore whether this structure would be viable, particularly with respect to its political, social and institutional impact. Moreover, the PWA proposed to take on a major role in this new structure, which consists of an economic and an environmental level. This despite the weak and inefficient coordination channels between the PWA and the related water-institutions, which facilitate and raise the independency of those institutions from all **directions** (lack and weak reporting to PWA is an example).

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2) The second proposed level in the new structure is the **Bulk Utility** which is supposed to perform key tasks such as delivering bulk water to utilities and municipalities, coordinate transactions with Mekorot, collecting bills and drilling new wells.

This is simply not a new **suggestion** because these tasks are supposed to be carried out by the West Bank Water Department (WBWD). However, the WBWD also has many problems such as high debts, which reflects its failure to force water institutions to pay their bills. Moreover during the interview with the head of WBWD it became clear that this department has minimal data regarding water projects implemented by other water institutions, especially NGOs. This leads to a duplication of work and an overlapping in roles and functions.

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not a new suggestion

The new proposed role of the **Bulk Utility** also does not mention anything about those communities which still not connected to the water system.

3) The third proposed level is the **Regional Utilities** (North, Central and South). These utilities are supposed to apply water strategies and policies approved by the higher institutional level such as the PWA and the National Water Sector. This structure could not be established for the following reasons:

a) The two major utilities (Bethlehem and Ramallah) which are supposed to be efficient and successful examples for other municipalities don't have a perfect record (especially Bethlehem where high salaries and high water losses are common).

b) It is hard to predict the regional utilities' capacity and performance, especially if these utilities will take away authority and power from the municipalities. This will in turn lead to jobs cuts and will negatively impact on the existing and long-standing authority of municipalities and utilities.

c) Most of these municipalities dispose of their own water resources and do not need to work in coordination with Mekorot. They first and foremost need an in-depth re-evaluation of their financial and administrative performance; they do not need to hire new managers and waste financial and personnel resources. The consequences of incorporating of these municipalities into the new format cannot be predicted.

d) Interviews conducted with municipal representatives showed that these municipalities are the lowest and poorest encourager of restructuring water institutions. This means that restructuring the institutional framework will have many social, political consequences which could even degenerate into violence, especially under the current political circumstances. (Job cuts and the subsequent falling away of family income is an important example).

e) **Regional utilities** will not be able to improve the performance of water utilities and municipalities in a short time. They will be obliged to seek assistance from private Palestinian or Israeli companies. This will lead to a monopolization of water resources and a subsequent increase in water prices which will not be accepted by the public.

f) Developing the proposed **regional utilities** to become real utilities requires great effort and high investments, especially in order to attract professional experts. This will consume much time and money, which could instead be used to develop existing water utilities and municipalities.

This study will assess the current institutional performance and identify whether the new proposed model is applicable. It will do this by evaluating the current performance of a

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number of water organizations and testing stakeholders' attitudes towards water sector performance. Moreover a new model for managing water resources will be proposed.

1.4 Main Objectives of the Study:

The overall objective of this study is to evaluate the current institutional performance of a number of water institutions in the West Bank. Using typical structural institutional performance criteria, it will investigate the appropriate institutional model(s) that are best suited to the Palestinian situation. At the same time, the study will analyze whether the new suggested model of water institutions can be applied according to the findings of this research.

The proposed model will be presented to the Palestinian Water Authority, as a basis for achieving the creation of sustainable and effective water institutions.

1.5 Specific Objectives

1. To evaluate the current institutional performance in the West Bank water sector.
2. To investigate the role of the Palestinian Authority in providing a legal framework for managing institutional performance.
3. To investigate the challenges and problems that water sector institutions face, and to examine their effect on the institutions' performance.
4. To investigate stakeholders (decision maker, municipal managers, NGO representatives, academic institutions and professionals) attitudes toward the current institutional performance of the water sector.
5. To examine the potential institutional model in order to ensure that all stakeholders can participate in water resource allocation decisions, conflict resolution and trade-off choices and the potential model will be recommended.

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1.6 Questions of the study

This study will answer the following questions:

1. How is the institutional water sector currently managed?
2. What are the incentives/ key factors motivating institutional change in the sector during different time periods?
3. What are the major problems and conflicts in providing water to the community?
4. Who are the major stakeholders who encourage the change?

5. Which institutional scenarios achieve the best use of water resources?
6. Are the current legal and institutional frameworks and settings in the West Bank conducive for water sector planning and implementation strategies? If so, how?
And if not, why not?
7. What is the fragmentation level among water departments, utilities, and municipalities in terms of technical, legal, financial and managerial performance?

1.7 Hypotheses of the study

1. Current institutional and structural frameworks and settings in the West Bank are efficient and cope with water sector needs, problems, conflicts and challenges.
2. These are clear, effective institutional strategies and policies for managing the water sector.
3. The current technical institutional performance of the water sector is inefficient, fragmented and dispersed.
4. There is a positive and statistical relationship between the availability of legal texts for managing water resources and the applied strategies and policies by water institutions.
5. There is a positive and statistical relationship between the need to renew the current regulations for water resources management strategies and policies, and the current disparity in efficiency and weak performance of water institutions.
6. There is a positive relationship between stakeholders' opinion towards reforming the institutional structure and the current deficiency of water institutions.
7. Non-Governmental Organizations are strong encouragers for restructuring and reforming the water sector's institutional structure.

Chapter -2-

Theoretical framework

2.1 The gap in water consumption between Palestinians and Israelis

There is a clear discrepancy between Palestinian and Israeli water use (PWA, 2003). Per capita water consumption in the West Bank for domestic, urban and industrial use is only 22 cubic meters a year, which translates to 60 liters per person per day. The average Israeli consumes approximately 104 cubic meters a year, or 280 liters per person per day for domestic and urban use. In other words, per capita use in Israel is four and a half times higher than in the West Bank. To make a more precise comparison, and taking industrial water consumption in Israel into account as well, per capita use per year reaches 120 cubic meters - 330 liters per person a day, or five and a half times Palestinian per capita consumption (PWA, 2003).

2.2 Water Supply Management and Utilities in the West Bank

Water supply and distribution in communities connected to water networks takes place through a number of bodies. The West Bank Water Department (WBWD) is a major bulk water distributor in the West Bank. Yet, actual control of water quantity, distribution and limitation, is in fact in the hands of the Israeli Water Company "Mekorot". Furthermore, while the Palestinian Water Authority directly supervises the WBWD's work, in reality, the WBWD has no real power or control over the water sector in the West Bank. Meanwhile, the WBWD is also charged with water distribution to the illegal settlements in the West Bank. Since settlements take priority in the provision of water from "Mekorot", certain Palestinian communities are dependent on water directly from settlements through a valve that is controlled by the settlers. The Bani Zied community in Ramallah is an example of such an provision.

Alternatively, some communities are supplied from the same water connections that supply Israeli settlements, In general, quantities provided by local bodies are simply not enough to meet basic needs, and Palestinian communities are most often forced to buy supplementary quantities from the Israeli water company "Mekorot" in order to meet minimum requirements (PHG,2005).

Water supplied to Palestinian communities through water networks comes from the following two major sources: water purchased from the Israeli "Mekorot" company (around 53% of total domestic water supply). The remainder (47%) are Palestinian resources including municipal wells, JWU wells, PWA wells, springs and other resources such as agricultural wells (PWA, 2003). The available water volume is steadily decreasing, while consumption is constantly increasing due to the population increase, the expansion of inhabited areas, industrial development, agricultural use. This also means an increase in the accumulated annual supply deficit. The combination of these elements is exacerbating severity of water crises, especially during the summer months (PWA, 2003).

2.3 Local Palestinian Water Sources

Local Palestinian water sources include water from wells owned by municipal/local councils, utilities, local springs, PWA wells and water purchased from agricultural private wells, particularly in the northern West Bank where no alternative sources are available. In general, these resources do not provide adequate quantities of water to Palestinian communities and most communities have to buy additional quantities to meet basic needs. Total quantities supplied to Palestinian communities from Palestinian sources (municipal/local council) during 2004, amount to about 32.6 MCM (PWA, 2003. See table 2. 1).

Table 2.1 Local Palestinian Water Sources, 2003

Governorate	Municipal wells (MCM)	Local Springs (MCM)	JWU Wells (MCM)	PWA Wells (MCM)	Other Resources including Agricultural Wells (MCM)	Total (MCM)
Jenin	2.134	0.11			0.235	2.479
Tubas	0.311	0.256				0.567
Tulkarem	4.369				2	6.369
Nablus	5.503	1.66			0.037	7.2
Qalqiliya	2.104				1.59	3.694
Salfit		0.174				0.174
Jerico		1.6			0.038	1.638
Ramallah			2.293			2.293
Jerusalem				0.077		0.077
Betlehem	0.482			2.004		2.486
Hebron	1.245			4.36		5.605
Total	16.148	3.8	2.293	6.441	3.9	32.582

*Source: PWA, 2003

2.4 Water institutions in Palestine

Until 1967, the West Bank was under the Jordanian mandate. Jordanian law were applied the water sector was under the Natural Resources Authority. Since the Israeli occupation in 1967, the Israeli authorities subjected all works and projects relating to water and water resources to its direct supervision and control following Military Order No.92/1967. This order prevented all Palestinian organizations and institutions from executing of any work connected with the management, maintenance or development of water services or resources without prior approval and licensing from the Israeli Military Authorities (GTZ.1995).

In April 1995, the Palestinian Water Authority was established to provide end users with potable water at an affordable price. The main role of the PWA is to be the regulator and supervisor of the water and waste water sector.

The PWA faces a major challenge: to ensure the continuation and fulfillment of its mandate as a regulator and supervisor at a time when external funding is decreasing. In order to achieve its goals, the PWA's primary objective is the creation of a sustainable water sector, The PWA believes that sustainability is a crucial issue for every institution. If the institution were a profit-seeking organization, the solution would be relatively easy, since the management could ensure certain profit levels are realized in order to be re-invested. However, the issue becomes more complex when dealing with governmental bodies whose main task it is to provide essential services to the people without realizing any profit (PWA,2002).

Water resources in Palestine are managed in different ways, such as public utilities, local municipalities, and communities. Therefore, the PWA believes that to create a sustainable water sector one must restructure the water sector institutions so as to guarantee efficient and optimum utilization of resources (PWA, 2006).

Since 1967 until the present time the Palestinian water sector is served by three types of institutions:

a) The West Bank Water Department (WBWD)

The WBWD is generally responsible for delivering bulk water to utilities, municipalities and villages. It is also responsible for the development, management and maintenance of transmission systems for some local networks. It coordinates the transaction between the Palestinian Water Utilities and "Mekorot" (the Israeli company). Currently, the WBWD acts as an executing structural organization to the PWA, but for administrative, financial and other functions it is related to the civil administration.

The WBWD has 400 million NIS of accumulated debt, which are payable by local municipalities and communities. There is also no data bank in which information from this department, other municipalities and non-governmental organizations can be stored, so that important facts and figures are often missing and other records are available in duplicate (WBWD,2007).

The WBWD was originally part of the Jordan Natural Resources Authority. Its tasks include:

1. Preliminary studies, design, preparation of tender specifications, as well as the supervision of execution of projects. It collects bulk water bills from municipalities and village councils, designs networks and performs other secondary works.
2. Monitoring of domestic and irrigation wells and springs, rendering services and technical advice to all water departments and utilities. In addition to the operation and maintenance of all water plants and transmission mains, including village internal distribution systems which belong to the water department (PWA, 2002).

b) Water Departments within local governments

Within each municipality and village council, there is a water department that tends to deal with the water systems in the service area of that local government. The number of workers in such departments varies, in small village councils; they have just few workers who are responsible for billing, collection and the maintenance of the water networks. But in main municipalities, there are also engineers, technicians and administrative personnel.

The major deficiency of these departments is their inability to allocate separate budgets for water sections, and the revenues were used to subsidize other activities, such as Tulkarem , Anabta, and Jericho municipalities (PWA, 2002).

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c) Two sub-regional utilities

There are two sub-regional utilities in West Bank. The first one is the Jerusalem Water Undertaking (JWA), which was established to serve the Jerusalem/Ramallah district, including cities like Ramallah, El-Bireh, Deir Debwan, Sliwad, Beitonia and Bier Zeit and some forty villages and refugee camps (PWA,2006).

The second one is in the Bethlehem district and is the "Water and Supply and Sewerage Authority" (WSSA) Besides Bethlehem, it serves, Beit Jala, Beit Sahour, and a number of villages and refugee camps. In total number 100,000 people are served by this utility.

These water utilities are non-profit organizations. They are administratively and financially independent and each has its own board of directors (PWA, 2002).

The National Water Council (NWC), which is chaired by the President of the Palestinian Authority (Table 2.2), was established through By-law No.2. Council members include representatives from the Ministry of Agriculture, the Ministry of local Government, the Ministry of Planning, the Ministry of Health, the Environment Authority, the Head of the PWA, NGOs and universities. The council's main function is to review and approve national water policies and water prices, reconsider the issue of private ownership of water, examine the central water projects and approve their implementation, and enhance regional and international water cooperation (Water Law, 2002).

Although the NWC was established to ensure the approval of water policy and coordination between Palestinian Authority organs, in practice it represents a stagnant body. NWC meetings are very limited in number and ceremonial in nature.

Table 2.2 Institutional framework of the Palestinian water sector

Cabinet of Ministries			Decision Making Level
National Water Council			
Palestinian Water Authority			Regulatory Level
Bulk water Utility			Service Delivery
Regional Water Utilities	Municipalities	Village Councils	

*Source :www.semide-ps.org

According to the PWA evaluation of the current water sector situation, three levels of future institutional arrangements have been recommended as follows (Approved by the Council of Ministries, Decision Number -5- 2006):

1. **The sector’s regulator.** The PWA would act as the regulator and overall supervisor of the sector. The task would be carried out at two different levels, economic and environmental. At the economic level, the PWA would be responsible for regulating the water tariff, since its mission is to provide potable water at an affordable price. Many municipalities fail to cover the basic costs of their operation and maintenance. It is believed that, once approved, the tariff structure would help water sector institutions to recover their full cost, including depreciation, loans interests, operation and maintenance. Municipalities and village councils would also be barred from to raising their water tariff without PWA approval.

By whom? :[14f]Comment

At the environmental level, the PWA would monitor the sector to protect resources from pollution and depletion.

2. **The second level in the institutional arrangement is the Bulk Utility (Approved by the Council of Ministries, Decision Number-5-2006)** This is basically a continuation of the present functions of the West Bank Water Department. The bulk utility would be responsible for implementing the PWA's national investment in infrastructure. The PWA would attempt to secure additional quantities of water by drilling new wells.

3. **The third level in the institutional arrangement are the regional utilities.** There would be four regional utilities providing the Palestinians with the required services. The first regional utility would be in Gaza Strip, the other three would be established in the West Bank (North, Central, and South). The regional utility would capture the idea of economies of scale and

build on the experience of private sector management. It should be noted that the water resources would not be privatized, but the services might be. The private sector would be encouraged to operate the systems, but would be monitored by the PWA (PWA,2006).

Palestine is a developing country. One of the main challenges facing governments in developing countries today with regard to the institutional arrangement of the water sector is the attainment of affordable access to clean water for all urban residents. In order to achieve this, water utilities must be strengthened to the point where they introduce self-financing. Without improved productive efficiency and cost-reflective tariff policies that will allow for self-financing investment and the delivery of services **will** remain in deficit and the quality of the service will remain poor (Nickson, 2000).

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However, institutional arrangements governing the water sector have been undergoing remarkable changes in recent years. Although both the nature and direction of these institutional changes vary by country-specific economic, political, and resource realities, there are clearly identifiable trends and patterns.

Focus The Water sector's crisis is linked to institutional changes through a chain of economic, political, and natural factors both within and outside the water sector. Current knowledge allows the tracing of this causative chain of change, including its nature and direction. However, current information about water institutions in Middle Eastern countries allows neither a precise quantification of the true transaction and opportunity costs of institutional change, nor a rigorous evaluation of the extent to which institutional inter-linkages can be exploited to promote water institutional changes with the least transactions cost. However, the occurrence of institutional changes in almost all countries does suggest the presence or emergence of the necessary conditions for institutional change (World Bank, 1999).

?? **:[16f]Comment**

Moreover, it should be noted that in order to have efficient institutional arrangements between water sector utilities, the organizational structure of all water utilities, departments, and municipalities should be shaped according to a consistent model. This means that each of these departments should be a reflection of the other in terms of water quality, water quantity, water price and employee performance, no matter what the distance between these departments is (ESCWA, 2003).

Distinct institutional water management has been implemented in different regions of the world. For example Spain and France are, since the 1920s and the 1960s respectively, applying a decentralized approach. **England**, on the other hand, has since the 1970s adopted the region at its unit of water management and decided to privatize the system (Duarte,2004).

Britain (ie England, Scotland, Wales Northern Ireland) or England

Other models of water management adopted by countries, regions, and provinces around the world include decentralization. centralization, while some do have an autonomous approach to water management.

The different institutional arrangements for water management systems are obviously influenced by the particular social, economic, political, historical and environmental contexts within which they are developed and implemented (Duarte, 2004).

Institutional management in the water sector resembles management in any sector. Stakeholders and decision makers are responsible for conducting institutional affairs to meet short- and long-term objectives, and for managing as service provider and **ongoing** institutions. Meanwhile institutional decisions relating to water use require the participation of stakeholders to avoid conflicting interests and to ensure sustainability. This usually encompasses technical, economic, social, environmental and to some extent political issues (Duarte, 2004).

Not quite clear what you mean

Institutional decision making regarding managerial models in the water sector with respect to sustainability should follow special criteria as follows (Kamal, 2000):

1) **Fairness or equity**: ensuring the acceptance of large-scale project alternatives by the affected stakeholders. 2) **Reversibility**: the degree to which the negative impacts can be mitigated. 3) **Risk**: stakeholders must be involved in the process of identifying and quantifying any social, economic or environmental risk that may be associated with each alternative model. 4) **Consensus**: this depends on the value judgment and compromise with regard to the participating stakeholders' perspectives.

The abovementioned criteria will incorporated in the new model proposed as a result of this research.

While water scarcity reflects a mismatch between availability and demand, information on the patterns of water demand and use should receive particular attention. Institutions should accord special consideration to the increasing stress on water resources, focusing on ways to create a sustainable water sector that provides consumers with good-quality water at affordable prices (www.unesco.org).

www.unesco.org? :[19f]Comment

In order to establish a sustainable water sector, many researchers have defined water as an economic good. They thus create a balance between supply and demand that is directly related to the cost of water services. For instance, if charges for water goods and services reflect the full cost involved, managers will be in a better position to judge when the demand for different water products justifies the expenditure of scarce resources to expand supply (Integrated Water Resources Management, 2000).

If water supply for the domestic sector is publicly managed, its development and management requires extensive technical capacity and financial resources. Population growth is exerting upward pressure on demand for adequate supplies of clean water. It has therefore become a challenge for water providers to supply clean water at affordable prices. As a result, in many parts of the world the private sector has become more involved in various aspects of water provision, ranging from supply development or management, to full project design and execution (ESCWA, 2003).

Another widely acclaimed, but highly controversial model of water management is the Public–Private Partnership (PPP), especially for water and wastewater services delivery.

When a restructuring of institutions in the water sector was suggested as a solution to the problems, it has to fill special criteria in order to achieve the best use of water such as:

what is "it"? here :[20f]Comment

a) Economic efficiency of water use: increasing water scarcity, lack of financial resources and growing demands for water mean that water must be used with maximum efficiency.

b) Equity: universal recognition of the basic right for all people to have access to water in adequate quantity and quality for the sustenance of human well-being

c) Environmental and ecological sustainability: the present use of the resource should be managed in a way that guarantees access to water for future generation (Integrated resources management, 2000).

The government must play a major role, as a regulator and controller, in policy making, water allocation planning, monitoring, enforcement, and conflict resolution. It therefore has to shift its role from service provider to service controller (Integrated resources management, No.4.2000).

The new model proposed by this research will take these important issues into consideration in order to guarantee efficiency and sustainability.

2.5 Forms of institutional arrangements

1) **Public Model:** where public organizations take responsibility for water supply, water pricing, regulation, maintenance, construction, and other management work. This model is however often characterized by certain limitations such as low level of managerial efficiency, low revenues, overstaffing, low client satisfaction levels, inadequate financial and career advancement incentives. This kind of managerial model is very common all around the world (ESCWA, 2003).

2) **Public Private Partnership (PPP):** both sectors work together within a properly defined framework where the government takes on the regulation, control, monitoring and tariff decisions, while the private sector takes the responsibility for other tasks such as improving technical and financial management, maintenance and building of infrastructure, attracting new investments, training and developing employees, and other tasks (ESCWA.2003) .

Over the past decade, PPP has emerged as a widely acclaimed but also highly controversial form of water sector management, especially in water and wastewater service delivery. Its use in these sectors aims to address mounting pressure for expanded services, better utility performance and dwindling public resources. Substantial capital investment and institutional reform are urgently needed for the expansion, rehabilitation, operation and maintenance of these services. It has been frequently argued that the private sector is in a better position to mobilize the resources and provide the technical needs than the public sector (Budds ,2000).

The term PPP is used to describe economic activities in which government and private agencies share in the costs and/or risks where these involve joint planning or negotiation (Bennett, 1998).

Meanwhile the private sector must assume operating risks during the operating period or assume development and operating risk during the contract period (Silva 1998).

Public Private Partnership must take many kinds of public and private risks into consideration, as illustrated in Table 2.3.

Table 2.3 Risks to the Public and Private Sector after (PPP)

Risks to the Public Sector after implementing PPP Model	Risks to the Private Sector after implementing PPP Model
<ul style="list-style-type: none"> • Monopoly: the private partner has the upper hand when implementing the PPP model, so government has to put regulations in place to prevent private companies acting as monopolists. It has to ensure that the sector is managed in a competitive way in order to have a good quality of service. • Job security of public employees. • Bankruptcy: the public sector has to be aware of allocating financial resources that will be shared with private sector in a way that guarantee the best use of financial and natural water resources. • Loss of control over assets in divestiture type projects. • Weak regulatory framework. 	<ul style="list-style-type: none"> • Excessive control/restriction by local government. • Infrastructure assets are “sunk”, therefore their quality cannot be assessed, nor can they be removed or deployed for other purposes . • Political interference affecting quality levels and targets. • Currency fluctuations and depreciation. • Investment must be made up-front, especially with BOO-type projects • Low-revenue collection. • Lack of government credibility as regulator or contractual partner. • Political instability.

** Source : ESCWA,2003

3) **Privatization:** This is a divestiture model whereby the private sector has full responsibility for the production, distribution and cost recovery of water and sewerage services (Calaguas, 1999, Nath, 1994).

Models of private sector participation in water and sanitation services can be divided into four categories (ESCWA, 2003).

1. Full privatization (divestiture)
2. Partial private-sector responsibility
3. Co-operative model
4. Informal sector provision

a. Full privatization (divestiture)

Under this model, the private company not only takes full responsibility for the operation, maintenance and investment, but ownership of the infrastructure is also transferred from the public to the private sector at an agreed fee.

The government then retains the responsibility for regulation. This model is uncommon and has only been adopted on a wide scale in England and Wales. Under a partial divestiture model, the state utility may be transferred via the sale of assets, the sale of shares, or a management buy-out; and the contract may be limited by license, with a substantial notice period being applicable (approximately ten years) if the contract will not be renewed (ESCWA, 2003).

b Partial private-sector responsibility

This category covers a number of different contracts in which responsibility for service provision is shared between the private and public sectors, with differing levels of responsibility being delegated to the private partner depending on the contract types as follows: (ESCWA, 2003).

1.b Service contract

These contracts are usually short-term agreements whereby specific operations and maintenance activities are contracted to the private sector. Payment to the private sector is usually made on the basis of fees agreed in advance, lump sums or unit costs. Under this type of contract, the public sector retains overall responsibility for the administration of the service and the private sector undertakes specific activities with a low degree of risk. Service contracts are often used for first-time private sector participation, or where the context presents greater risks to the private sector.

2.b. Management contract

A management contract entails private-sector responsibility for utility operation and maintenance, but without the obligation of investment or commitment of private investment capital. This is therefore a low-risk contract, but with greater responsibility than a service contract. These contracts typically run for approximately five years.

3.b. Lease contract

Under lease contracts, the private firm operates and maintains the utility at its own commercial risk, deriving revenue directly from tariffs, but does not invest in infrastructure. Such contracts usually run for between six and ten years. Tariff levels are negotiated to allow the private contractor to cover at least operation and maintenance costs (ESCWA, 2003).

4.b Concession contract

Under concession contracts, the private company manages the infrastructure facility and operates it at its own commercial risk, and also accepts investment obligations. Such contracts are usually fixed for long terms of between 25 and 30 years to allow the operator to recoup expended capital, and at the end of the contract, the assets are transferred back to the state. The role of the government in concession contracts is predominantly regulatory. *[Build-Own-Operate]-[Train]-[Transfer]-type contract (BOO/BOT/BOOT/BOTT)*.

These contracts are similar to concession contracts with the difference that they are usually used for green-field projects, as the private contractor is also responsible for constructing the infrastructure. The private partner constructs and manages the assets in a similar way as under the concession contract, and the public authority often makes payment to the private partner for the supply. At the end of the contract, the assets may either remain indefinitely with the private company or be transferred back to the government, sometimes at a pre-determined fee (ESCWA, 2003).

c) Co-operative model

The co-operative model is a type of government-owned public limited company (plc) subject to the rules and regulations of other plcs and of which the majority of shares are publicly owned (either by government or citizens/users). This model then combines public ownership and operation in accordance with business principles. Such arrangements are in place in countries including the Netherlands, Germany, Poland, Chile, Bolivia and the Philippines (ESCWA, 2003).

d) Informal sector provision

Provision of water and sanitation services to the poor by “informal” and/or small-scale operators is common in most low- and middle-income countries, especially where the poor lack access to formal service provision. Traditionally, informal providers have operated separately from the government; however there is an increasing number of cases in which the government is supporting small-scale private initiatives in order to increase service provision to the poor (ESCWA, 2003).

e) Other alternatives

The Business Partners for Development initiative supported by the World Bank is investigating tripartite partnerships between public sector, private sector and civil society, on the assumption that agencies working together can serve the needs of the poor better than the efforts of a single agency. Other initiatives being examined in the literature focus on community provision and the role of other civil society organizations in water and sanitation provision to low-income areas.

Privatization has positive and negative aspects that should be taken into consideration, as shown below in Table 2.4. (ESCWA,2003) .

Table 2.4 Positive and Negative Aspects of Privatization Schemes in Water Supply and Sanitation Services

Negative aspects	Positive aspects
<ul style="list-style-type: none">- Neglect of service expansion in underserved and poor communities.- Monopoly and distrust of multinational corporations.- Foreign control over national natural resources.- Transfer of assets and profits out of the community or country.- Risk of ecosystem degradation, especially with regards to water quality.- Community participation ruled out.- Elimination of subsidies for low-income groups.- Higher water tariffs.- Possible loss of ownership of water.- Neglect of potential for efficient water use and conservation where that would entail foregone earnings .	<ul style="list-style-type: none">-Availability of management skills and technical know-how to improve the service.- Flexibility in mobilizing financial resources and greater risk-handling capabilities.- More responsive to community needs.- Enhanced service quality.- Elimination of inappropriate subsidies.- Creation of self-supporting utilities.- Improved cost recovery without risk of political manipulation.- Reduced balance of payments.- Greater financial resources for potential expansion and improvement.- Quick response when system maintenance and repair required

** Source: Nickson, 1998

This theoretical framework will be used as a reference for building the new model, if it is found that the current institutional performance needs restructuring. All the previous negative and positive aspects will be taken into consideration, especially as this is the first time that this framework would be applied if a new model is required.

2.6 Literature Review

Over the last several decades, water has been conceptualized as a service, an economic good, a social good, an environmental need, a human right, and in many other ways. Many researchers, professionals, and academics have extensively discussed these concepts, they have evaluated the situation in their countries, analyzed it, and recommended how to usefully combine these concepts.

Several managerial models have also been discussed, tested, and recommended in each country. These models have been established as a substitute to the public model. Privatization and Public Private Partnership Models have been extensively and widely discussed.

Increasing access to water services for communities in the developing world is one of the major challenges in the global development agenda. It is not just a question of building and expanding new infrastructure to underdeveloped areas. There is also a need to maintain and rehabilitate existing institutional structures, to improve service quality and protect the natural resources. The construction, operation and maintenance of a water system involves huge costs. Sharing these costs fairly among all system customers is a prerequisite for the sustainability of the system and for the quality of the service. The legitimate costs of water services must be covered either by users through water charges or by direct government subsidies from customers. The underprivileged should not be neglected; they need water, even if they can't pay, and this provides an additional challenge to the water provider (Suhail. M., 2004).

Institutional water structures, should be managed efficiently (Nickson, 2000). Efficiency can be measured in two ways: **technical efficiency** and **financial efficiency**. The following three indicators are used to measure the **technical efficiency**, (that is the relationship between resource inputs and outputs) of water utilities:

- **Water losses**, expressed in the form of unaccounted for water (UFW). This indicator measures the difference between the volume of water delivered to the distribution system and the water sold, expressed as a percentage of net water production as delivered to the distribution system.
- **Meter performance**, expressed as the percentage of connections with meters in working order.
- **Water demand and supply rates**, expressed as the balance between water demand and supply rates and the efficiency in making a balance between them.

The following three indicators are used to measure the **financial efficiency** (that is the degree of success of a utility in achieving organizational targets at minimum cost) of water utilities:

- **Average tariff**, expressed in US\$ per cubic meter.
- **Personnel cost ratio**, which measures the ratio of total personnel costs to total operating costs, excluding depreciation, interest payments and debt-service payments.
- **Collection efficiency**, expressed in the form of total annual collections as a percentage of total annual billings.

In the meantime, the following two indicators are used to measure effectiveness (the extent to which outputs achieve original objectives) of water utilities:

- **Service coverage**, which measures the proportion of the population in the service area that receives water from the public system.
- **Water availability** that is measured by the number of continuous hours per day for which water supply is available from the public system (Nickson, 2000).

The applicability of the previous indicators will be tested through the case studies in which all these indicators and other additional indicators were used to evaluate the institutional performance of a number of water sector institutions.

Successful and sustainable institutional water resource management depends on the role played by institutions, their impact on people, people's confidence in them, and their transparency. These considerations are key factors with a direct impact on the effectiveness of

institutional arrangements and the utility of their role in water resource management. Each one of these arrangements has advantages and disadvantages as shown in Appendix 1.

Until recently it was widely accepted that water should be provided as a public good and that, as such, water utility ownership and management have to be in the hands of the government, departments or enterprises (DAG, 1996).

In the majority of cases of water management around the world, little cost was recovered and government subsidies and multilateral loans were relied upon to meet water supply costs. However, due to both public expenditure cuts and poor institutional capacity many developing countries have been unable to keep up with maintenance requirements or cope with expansion in demand for water. The result is increased pressure for water utility restructuring and the introduction of cost-reflective tariffs to enable water utilities to become self financing (Cook, 1999).

Private participation in the water sector in developing countries has increased in 1990s. According to the World Bank, the number of private water projects increased more than ten times between 1990 and 1997, although private involvement still remains low relative to public provision in the water sector (Silva, Tynan and Yilmaz .1998).

By 2000, at least 93 countries in various parts of the world had initiated some form of privatized water and wastewater service delivery, with total contracts awarded to the private sector covering an estimated 10% of water supply services worldwide, and serving over 300 million end users. There is thus an international consensus that public-private partnership in water resource management offers some indisputable benefits.

At the same time, it is important to understand the drive towards privatization and the benefits and risks associated with the various options that have been adopted or proposed. The most important thing is who the partners involved are, in terms of their financial, technical standing and their political clout. All these issues are important determinants of the outcomes of privatization (ESCWA, 2003).

Palestine is located in the Middle East. Many studies have been conducted to evaluate the situation and to find a solution to water demand and the challenges that face water institutions.

Z. Mimi and A. Marei (2002) suggested that the available funds for the Palestinian Water Authority and other municipalities to implement water and wastewater projects should be limited. As a result, it is important to fully explore other approaches to meet funding needs. One recommended approach is Public-Private Partnership (PPP). They pointed out that the private sector already has access to financial markets, and has successfully invested in telecommunication and electricity sectors. As a result it will be able to help the public sector increase efficiency and reduce costs and facilitate access to capital and capital improvement. It will also guarantee a sustainable development of sectors with limited financial resources and reduce dependency on external funds .

Klawitter and Barghouti (2006) illustrated the need for reform in the institutional structure of the current Palestinian water sector. After analyzing the Palestinian water sector they made a number of recommendations, including:

- Strengthen the institutional reform process while establishing mechanisms to ensure proper administration of justice, law enforcement, and accountability
- Strengthen good water governance while focusing on state building
- Build institutional and personnel capacity
- Ensure ownership of resource use, infrastructure and decision making process
- Improve coordination of state- and locally acting non-state actors of the water sector and enable legitimate opposition by NGOs
- Ensure ownership of resource use, infrastructure and decision making process
- Improve donor coordination, willingness to exchange of information and donor policy caused discrimination

According to Saghir and Woldu (2000), 4% of the world population lives in the Middle East and North Africa region, while it disposes over only 1.4 % of global water resources. This region consists mainly of arid desert and suffers from the freshwater scarcity, a growing gap between water supply and demand and deteriorating water quality. They suggested that the private sector should be involved in water management in order to guarantee efficient use of

the scarce resources. To accomplish this task, they recommended that several key issues be addressed:

1. The government should draw up and pursue sound policies and establish an adequate legal, regulatory and institutional framework.
2. The procurement arrangements for attracting the private sector must be clear, credible, and well-designed.
3. The government will have to further reforms of the legal system to enable the private sector financing of the water infrastructure and other projects.

Since water availability in Middle East is critical in terms of quantity and quality, a conference was held in Egypt in 2002 to discuss Public-Private Partnership as a possible solution for the future. Several case studies were examined, ranging from water supply and sanitation to infrastructures financing, groundwater management, cost recovery for water supply and irrigation services, institutional reforms to allow private sector participation, commercialization, capital investment programs, and other related issues. Based on evidence from the Middle East region, the conference concluded that the private sector could provide new investment capital; good managerial, technical and financial expertise in operating and maintaining systems; rapid adoption of new technologies; reduction in public subsidies; improvements in water supply, sanitation and water disposal practices; development of functional information systems; improvement of institutional capacities, improved customer service, etc.

The alternatives to private sector participation in infrastructures could range from the government retaining full responsibility for operation, maintenance, capital investment, financing and commercial risk, to the private sector assuming much of these responsibilities. The private sector is also expected to make the consumers more aware of the value of water and wastewater collection, treatment and disposal.

Based on the case studies prepared for the conference, it was found that when private companies take over the operation of a public utility, the main problems they face include high rates of unaccounted for water (often over 40%), low water rates, low collection of water rates, poor management of assets, over-staffed institutions with low efficiency and morale, and inadequate availability of investment capital (Public-Private Partnership Conference, 2000).

Based on the previous literature, it was concluded that the public sector has many problems in managing water resources. PPP contracts are therefore becoming more common.

In Palestine, this type of contract has never been put in use, partly because the PWA was only recently established and partly because of the ongoing economic and political uncertainty. This research will examine such contracts could enhance and develop the institutional performance of the water sector.

2.7 Regional experiences in water sector management

In Jordan's capital Amman, a directly awarded wastewater management contract was put in use. The responsible private operator, the French company LEMA is for 75% owned by Ondeo and for 25% by Montgomery Watson. A four-year management contract was initiated in July 1999 with World Bank funding. The contract included management, operation, incentive and investment fees.

Among the contract's objectives were to decrease the unaccounted for water to 25% during the contract's span, improve the reliability of water supply to users, repair and replace water meters, and improve customer services. A project management unit was established to monitor progress and regulate the performance of the private operator.

Since training is an important consideration, the contract provided for 18,000 hrs/year of staff training, mainly in the areas of technical activities, information systems, customer services, and language. The training programs were discussed with the regulator unit and were then adapted accordingly.

This management contract was the first step to consider private sector participation in Jordan. Based on the results of this effort, Jordan is expected to formulate the best form of private sector participation in the water sector, including irrigation (Public-Private Partnership, Conference, 2000).

In Yemen, there has been a gradual evolution from a focus on infrastructural development to management and institutional development, capacity building and participation of the private sector in water management. Not surprisingly, initially, there were protests against the implementation of institutional reforms, restrictions for providing incentives, and difficulties in applying tariffs which would allow cost recovery. The water authority has been decentralized, except for the recruitment of high-level staff. Currently, 16 of the 32 branches are autonomous, with their own board of directors, and participation of the private sector. Yemen is now in the preparatory phase for including the services of private companies in the water sector (Public-Private Partnership, Conference, 2000).

Bahrain also has experience with privatization, starting in 1999 when the government identified the need for additional sources of power and water. Based on population growth estimates and in order to reduce the financial burden on the state, means were examined to involve the private sector in infrastructure development as part of the Independent Power Producer (IPP) concept. In IPP a private body finances and develops the infrastructure and sells the product to the government at a pre-arranged price, while the government provides the necessary financial and legal framework.

Al-Awadi (1999) concluded that, for a market as small as Bahrain, privatization policies must be approached with caution. Policies that could be successful elsewhere, even in the Gulf, may not be applicable to the Bahrain market. However if factors other than economics affect the issue, then the consumer must be prepared to pay real price for water and electricity. Meanwhile, if privatization takes place without curtailing subsidies, it will only increase the burden on the government. It is also necessary to seek competitive bids for power and water projects instead of negotiating them privately.

2.8 International experiences in water sector management

In the UK and France the water sector is privatized. Several papers have formalized the choice between private and public production. Mohammed, Dore, Kushner and Zumer (2003) found that the choice between private and public production should be based on the general framework of the theory of optimal taxation, which is a subset of public economics. This theory suggests that the decision should be based on which form of enterprise has the absolute efficiency advantage. An enterprise would have an absolute efficiency advantage if: (a) its product were superior in terms of quality, (b) it could supply the goods at a lower unit cost, and (c) the production did not entail any negative externalities. If these three conditions were to be met, the consumer surplus would be at its highest. In the light of these requirements and in the case of both France and the UK, water quality improved, but at a higher cost in terms of prices and higher returns on private capital. Indeed the improvement in water quality could be the result of better regulatory regimes spurred on by the the European Union. Thus the authors concluded that the evidence from these two countries does not support the case that the private sector has an absolute efficiency advantage in drinking water production.

In Australia, where the water sector is managed by the government, an alternative managerial model was suggested by Robert Sadler in 1998. It involved the introduction of a new leadership mindset based on entrepreneurially driven core business centers. These business centers were to focus on sustainable competitive advantages. They would be required to transform themselves from being service providers to service managers, to develop networks and strategic alliances with service providers and to embrace mindsets beyond the structured “new managerialism” promoted among the Australian public.

The Australian water sector was suffering from a huge accumulated debt. It was driven by anti-competitive monopolistic practices, with a history of capital misallocation. In addition, it had no strong incentive to improve customer service or reduce costs, and had become unaccountable.

They recommended that the water industry adopt a new and progressive mindset, moving beyond the “new managerialism”. The key lay in the hands of industry leaders: they had to show their preparedness to recognize that discontinuous change requires risk-taking and initiative in driving solutions from strategic alliances rather than traditional in-house engineering models or even in-vogue public sector management practices.

According to a study by Cook (1999), privatization of utilities has grown in developing countries in recent years. Privatization transactions for the utilities sector have accounted for over a third of all sales in developing countries. He found that the introduction of privatization does not necessarily mean more competition; on the contrary, it often leads to the creation of regulatory structures that protect consumers from monopoly abuse and provide incentives to firms to maintain efficiency. His study focused on public utilities such as telecommunication, electricity, and water. For the section on water management, he studied the experience of **Argentina**, which adopted concession arrangements; **Guinea**, where a lease was awarded to a water management company, and **Malaysia**, where a range of privatization methods were introduced into water sector.

He found that studies of water services have shown that governments should focus on privatization methods that they can handle, both in terms of capacity and resources. At each stage a clear allocation of responsibilities and risks between sectors needs to be determined, according to the functional capacity of each sector. He recommended that where governments

initially lack the capacity to perform, private investment preferences should be given to an incremental approach to privatization.

Once a comprehensive regulatory framework is in place and attractive investment has been created, the government can move on to more complex privatization.

Chapter -3-

Methodology

The methodology of this research will form the core of the assessment and evaluation of a number of water institutions working in the West Bank. The assessment will be based on collecting secondary data from these institutions concerning their technical, managerial, financial and management information system performance. This chapter focuses on an analytical methodology based on an evaluation of all institutional arrangement aspects. It is therefore divided into two work stages:

3.1 Case Studies

Data was collected from municipalities and a water unit through a field survey which was conducted with five water unit representatives. Data focuses on structural institutional performance criteria such as water quantities, water price, water demand, water supply and water quality (Appendix No.2 and No.3).

This survey will assess their performance, and investigate the differences between water units. It will identify the main reasons for these differences and the impact they have on institutional performance. This part of the study goes beyond the theoretical framework and will be analyzed through actual results provided by each case study. Five case studies were chosen to achieve the aforementioned goal. They are:

- 1) Tulkarem Municipality .**
- 2) Anabta Municipality.**
- 3) Jericho Municipality**
- 4) Jerusalem Water Undertaking /Ramallah.**
- 5) Water Supply and Sewerage Authority /Bethlehem**

This part of the methodology will be supported by an additional tool, in the form of a questionnaire which was distributed to different Palestinian stakeholders who have experience in the water sector. One hundred questionnaires were distributed to target stakeholders. The results of the case studies and the questionnaire will then be statistically evaluated and

compared in order to assess whether there are any parallels between the case studies and the questionnaire results.

Case Study No.1 Tulkarem Municipality

Tulkarem municipality is one of the largest northern municipalities in the West Bank. It was established in 1960, while water department was established in 1986. This department is responsible for the production, maintenance and all other related technical activities of water resources in the coverage area, while it also provides feedback to the municipality.

The department provides water to Tulkarem district including Tulkarem city, Tulkarem refugee camp, Noor Shams refugee camp, Al-Jarushieh village, part of Iktaba village, and other places outside the municipality borders.

According to the data provided by the PWA, 17 communities in the Tulkarem district are still not provided with water until the present date.. These communities, which have a total population of around 63,342 people, do not have a local council as they subsidiary to other communities. A number financial, technical and political reasons, have made it difficult to connect these communities to the water services (PWA, 2006).

Tulkarem municipality is classified as a non-profit organization. Eighty-two employees work at the water department. They are responsible for technical issues, data entry and fieldwork, while other administrative work like accounting and human resources management falls under the responsibility of the main municipality.

1) Regulation Framework

During the interview with the responsible engineer, it was noted that the department does not dispose of a copy of the water regulations, the "water law", which was published and distributed by the PWA in the West Bank and Gaza Strip in 2002.

The water department is responsible for ensuring and providing the demanded quantity of water. It is also responsible for quality control. Chlorine content is checked on a regular basis, while the PWA conducts a water quality check twice a year, in addition to controls by the Ministry of Health.

2) Technical Framework

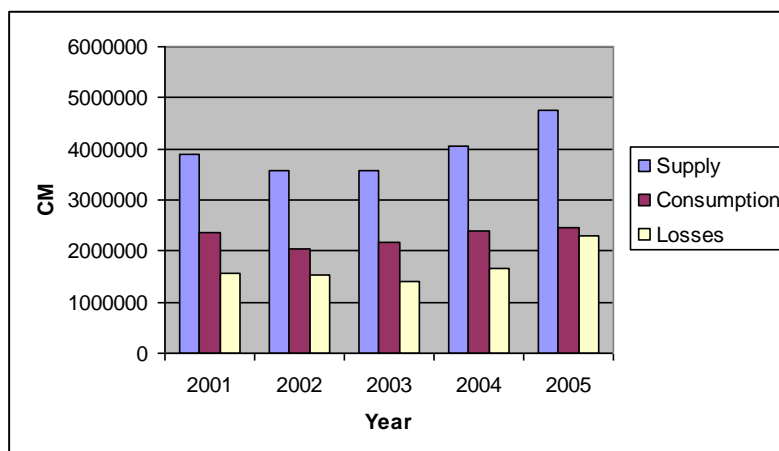
Water Supply, Consumption and Losses

The water department satisfies its water needs from two sources:

a) Municipality wells. b) Palestinian private wells. The water department owns four wells, but the municipality's dependency on the agricultural private wells has increased, mainly during summertime. It purchases water from four other private wells, to cover 10-15% of the total water supply.

The water department can satisfy the municipality's water needs independently, which means that it does not have to buy water from Mekorot. The water network is about 200 km in length and serves 59,000 household customers 7 days a week and 24 hours a day (Tulkarem Municipality, personal interview, 2006).

Figure 3.1 presents water supply, consumption and losses in the period between 2001 and 2005 (based on available data). The supply ranges between 3,57 MCM in 2002 (the lowest rate) to 4,76 MCM in 2005. In both years only about 57% to 61% of the produced water was actually consumed by customers. The remainder was classified as water losses.



**Source: Tulkarem Municipality, 2006

Figure 3.1 Annual water Supply, Consumption and Losses of Tulkarem Municipality in MCM (2001-2005)

Figure 3.1 presents a fluctuation in the rate of water losses which equals about 48.4% in 2005. Water losses clearly increased sharply in 2005, though the reason was not identified. One

explanation could be that water supply and demand were inaccurately calculated, thus affecting the percentage of water losses.

The main reasons for the high rate of water losses can be classified in three categories (Tulkarem Municipality, personal interview, 2006):

- 1) Network leakage: the network was constructed in 1933, and is still partly in use. Network improvement depends on the availability of funds, and in most cases there are insufficient funds to rehabilitate the networks, leading to ever-increasing water losses.
- 2) Illegal practices on the part of consumers, estimated to account for 15% of losses.
- 3) Metering problems.

In order to eliminate this problem, the municipality is planning to take the following actions:

- 1) Renew the network. Part of it was recently renewed, though extra funding is needed to continue the work.
- 2) Change the counters from metering to volumetric counters. (a proposal for this project is available, it needs funds and also public awareness).
- 3) Monitoring customer actions, and raising public awareness.

The negative impact of high water loss on efficiency of water services is noticeable in the following:

1. The increase in dependency on private wells.
2. Real water consumption was about 227 l/c/d in 2005 if total water production had been consumed with zero water losses. If one takes water losses into consideration, the real water consumption came to 117 l/c/d. This means that water losses amount to about 110 l/c/d.

3) Management Framework

According to the structural institutional performance criteria, management performance can be achieved by measuring different indicators, which will be discussed in detail as follows:

a) Availability of Organizational Structure

This water department does not have a clear organizational structure; it is just a constitution. They follow a simple organizational structure. There are 82 employees distributed according to their qualifications and skills, starting with the responsible engineers and ending with well guards.

This makes it hard for them to know where the functions fit in the department. It also makes it difficult to understand how the department works and discourages cooperation and communication. However, the lack of organizational structure limits the reporting relationships, responsibilities and how functions work together.

b) Availability of Job Description and Job Specifications

The interview revealed that this department does not have a brief and that its employees do not have a job description. The employees follow a procedure which is not formally documented, but which is used as a term of reference for the performance evaluation of each employee. The absence of job descriptions and job specifications makes it hard for employees to know what his duties and tasks are. It also leads to duplication of work, and unclear working systems, duties and tasks.

c) Human Resources Management (employee's qualifications, salaries, training and development)

The employee's qualifications depend on the required tasks. Site engineers and technicians are generally highly qualified, while meter readers have low qualifications. It was noted that important positions such as water resources manager, planner, developer and public relations representative do not exist in this water department.

The majority of employees are full-timers, the rest are temporary employees, who are hired on a temporary or sometimes daily basis. Available PWA data show that the sum of salaries for water department employees was 1,882 million NIS in 2004, increasing to 1,989 million NIS in 2005.

This water department provides employees with necessary training and development skills, either through local or international programs. Most of the training programs are implemented by NGOs such as GTZ and the UNDP. They focus on technical skills, the writing of proposals and fund raising skills. (Tulkarem Municipality, personal interview, 2006).

4) Financial Framework

a) Water Tariffs

The cost of one cubic meter of water is 1.86 NIS and the municipality sells it at consumption rates. Water consumption tariffs increase proportionally with according to consumable water quantities (table 3.1).

Table 3.1 Water consumption tariff for Tulkarem municipality

Category	Price / J.D /cubic meter	Price /NIS/ cubic meter
0-5	2.5	≈ 15
6-30	3.25	≈ 19.5
31 and above	3.5	≈ 21

**Source: Tulkarem Municipality, 2006

This tariff system was approved by the municipal council in 2001 under the principle of cost recovery with a small profit margin. It is linked to the Jordanian Dinar and not to the NIS. Value-added cost is determined by the municipal council under the category of services. The tariff system applied by the municipality was approved without clear terms of reference or an established economic basis for price fixing (Tulkarem Municipality, personal interview,2006).

Each water unit or department should achieve technical efficiency through high collection efficiency and a low rate of customer complaints (Nickson.2000).

b) Collection Efficiency

Collection efficiency is calculated by using the following formula:

Is the formula missing? :[22f]Comment

Total annual collections

Total annual billings

The collection efficiency in 2004 was 35%, and increased to 37.27% in 2005. Both percentages are still low and reflect the municipality's inability to collect bills. Collection efficiency decreased due to the following reasons:

1) The prevailing social, economic and political conditions in Palestine have resulted in many public groups refusing to pay their utility bills. This phenomenon is particularly widespread in refugee camps and villages. (It reaches 100% in certain areas).

2) Absence of legal and executive authority to constrain customers to pay their bills.

3) The lack of public awareness among customers towards water value and scarcity.

According to the persons in charge, the water department only has limited customer complaints with regards to water quality and quantity. This shows that the majority of the population receives water and that water is considered to be a public, and not an economic good. This means that the responsible authority should provide water to each citizen regardless of cost.

c) Accumulated Debts

One of the major problems of the water department is the high accumulated debt, rising to around 22 million NIS in 2006. The main reason for this high figure are unpaid bills in addition to other expenses such as energy expenses. But the water department must continue its work in spite of accumulated debt and financial deficit, providing water to customers who pay the cost of water services and who are not paying.

Are they or are they not paying? :[23f]Comment
Very confusing sentence

These debts will further affect the municipality's financial performance and its ability to cover their operational costs. The municipality wants to find a solution to its problems but many political, social and economic factors are preventing this.

d) Personnel Cost Ratio

This ratio is calculated according to the following formula:

Sum of water department salaries

Total expenses for the water department

In 2004 the personnel cost ratio was 46%; in 2005 it was 43%. This is a comparatively high percentage. This ratio should be ideal and consist of total costs and not just random costs.

Sentence not clear – what is the :[24f]Comment
ideal ratio? What are total costs and what are random costs in this context?

e) Profits or Losses

Available data show that this water department apparently made a profit of 2,124 million NIS (total revenues–total expenses) in 2004, a sum that increased to 3,274 million NIS in 2005. This increase was ascribed to the increase in revenues from paid bills, and also from the decrease in purchased water expenses, which was nil in 2005 (Tulkarem municipality financial data, 2006).

These numbers indicate that this water department is profitable, even though it is classified as a non-profit unit. The contradiction lies in the fact that the water department is financially linked to the municipality. They therefore share costs with other departments, in spite of water department needs. However, the municipality does not use its profits to improve or rehabilitate water networks, or carry out other necessary work. Instead, they depend on foreign aid for these costs.

f) Cost Recovery

In general, a water unit should be efficient and have successful cost recovery system. However, most Palestinian water utilities do not achieve cost recovery, including operation and maintenance (O&M) costs, capital costs, and the cost reserved for future development of the water systems and resources.

Moreover, depreciation expenses should be added to the total expenses. In this department this is not the case. Financial data provided by the department show that there are no proper financial records or asset registers.

Until now, the value of assets has not been estimated and criteria to do so have not even been identified. Consequently, this water department does not achieve cost recovery. It only covers daily expenses and salaries; other revenues placed in the municipality's accounts.

g) Fund Raising Criteria

Another indicator of financial performance is the fund raising criteria implemented by each water department. This department has continuous activities for fund raising. They uphold continuous contact with funding agencies like GTZ and the UNDP, and they also have a number of completed proposals for water resources management and needs.

They have received funds from the World Bank, Save the Children, and the UNDP among others, to implement projects such as drilling of ground water wells and rehabilitating water networks and old wells.

5) Management Information System

The management information system is crucial to water institutions. It allows for the efficient management of available information and allows for the data to be analyzed in terms of the annual supply and demand of water, as well as the prediction of future needs.

a) Managing Information between the Water Unit and the Main Municipality

There is a direct and clear information exchange system between the water department who reports to the municipal administration on a continuous bases.

b) Sharing National Data

The water department should have full knowledge and information about the activities of water departments in other villages or cities. Information flow is essential for the sharing of experience. There was a lack of information about other water departments, the exception being a summary about water sector performance which was distributed by the PWA in 2004. This lack of coordination and shared data reflects the heterogeneity among water units and departments in the West Bank even though groundwater resources are shared.

c) Coordination with the PWA or other municipalities

The PWA is the regulator and overall supervisor of the water sector. Successful and efficient institutional management of the water sector requires coordination and consistency between water departments, units, and municipalities. It was noted that the water department has a low level of coordination with other municipalities. More importantly, there is a lack of coordination with the PWA, though there is water quality control and the late financial reporting to the PWA which only started in 2004.

d) Data Entry

The department has a computerized data entry system. The data bank includes information about water production, water consumption and water losses. They only started to record these data in 1998.

e) Availability of Master Plan and Annual Reports

As each water unit and water department works according to the principle of sustainability, this water department has had to prepare a master plan for the future, in this case for the

coming 20 years. It was prepared by the responsible staff and includes data about the expected water production, water consumption, and water deficit. Besides recommendations for improving the department, it also featured reflections on the future of the water sector if the present accumulated debts, water losses, and the other shortcoming are not dealt with.

6) Conflict Resolution

In this department conflict resolution is implemented by the municipal council, both for internal and external conflicts.

Previous analysis indicates that this water department has many problems. They can be summarized as follows:

High water losses, low collection efficiency, high accumulated debts, high personnel cost ratio, dependency of the water department on the municipality, and failure to accomplish cost recovery. This means that this municipality needs to re-evaluate its performance at all levels. It also need help to improve networks in order to minimize water losses.

Case Study No. 2 Anabta Municipality

Anabta municipality is located in the northern part of the West Bank. It was established in 1956 and the water department that is part of Anabta municipality was established in 1961. This department is responsible for managing water services in the area. This includes: monitoring, maintenance, fund raising, project implementation and production of drinking and irrigation water. It provides water to Anabta region including Anabta, Rameen village, Kuf Rumman and the Leather Manufacture. The water department has 10 employees, (8 administrative and 2 technicians). The administrative employees are responsible for fund raising, project management, water resources management, while the technicians are responsible for maintenance, in addition to the reading the counters (Anabta Municipality, personal interview, 2006).

1) Regulation Framework

It was noted that the water department does not have a copy of the water regulations or water law, which was published by the PWA and distributed in the West Bank and Gaza Strip in 2002. They depend on their internal control by regulatory checking of wells, in addition to the water quality check implemented by PWA twice a year. There is also a yearly water quality control conducted by the Ministry of Health. The municipal council is responsible for controlling water quality, quantity and tariffs.

2) Technical Framework

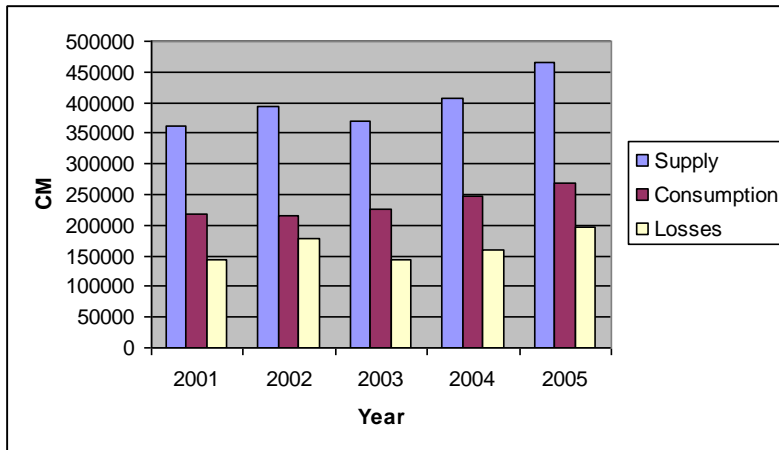
Water Supply, Consumption and Losses

The municipality has its own water resources, which satisfy its water needs, in addition to those of nearby villages and refugee camps. It has 3 operating wells and provides water through networks which were established in 1961. The length of the network is around 15 km and provides water to 10,000 household customers 24 hours, 7 days a week with equity among customers. The average pumping rate is 1,000 cubic meters/day. The department expects to cover the municipality's needs for the coming 30 years.

Figure 3.2 presents water supply, consumption and losses in the period between 2001-2005

(Based on available data). Supply ranges between 351 CM in 2000 (lowest rate) and 464 CM in 2005 (highest rate). The increase in supply was a result of the increased rate of water losses and an increase of new connections to new customers. Supply rates mean that only

about 55-63% of produced water was actually consumed by customers. The remainder was classified as water losses (Anabta Municipality, 2006).



**Source: Anabta Municipality, 2006

Figure 3.2 Annual Water Supply, Consumption and Losses for Anabta Municipality in CM (2001—2005)

Figure 3.2 presents the fluctuating rate of water losses which ranged between 45% in 2002 and 35% in 2006. The main reasons for the high water losses can be classified in three categories:

- 1) Network leakage: the network was constructed in 1961, and is partly still in use, though sections have been renewed. Due to the high cost of rehabilitating the networks, the municipality depends mainly on available funds, but this leakage equals only 10% of the total losses.
- 2) Illegal practices by consumers, including the manipulation of counters, can be considered as water losses. It amounts to about 70% of water losses, i.e. a very high percentage.
- 3) Inaccurate criteria for the calculation of water supply and demand.

To deal with this problem, the municipality plans to take the following steps:

- 1) Renew the network. This is very expensive and depends on fund availability. In most cases there are no funds.
- 2) Monitoring customers' actions by regularly checking and taking corrective measures.
- 3) Raising public awareness.

The impact of water losses on the efficiency of water services is seriously affecting water quantities. By taking real the water production ratio and dividing it by the total households, each consumer should consume 121 l/c/d, assuming zero water losses.(2005 was taken as an example). However, because of the water losses each consumer effectively only consumes only 74 l/c/d. Both ratios are low compared to the total water consumption needs recommended by WHO which is 150 l/c/d.

The water saving measures proposed by the municipality require time and money, especially with regards to network improvement. The Palestinian Authority's first effort should go towards protecting this municipality from customers who steal water, destroy the system and waste resource. Legal action should be taken against these people and public awareness should be increased.

The municipality also has to focus on raising additional funds for network improvement. A new efficient calculating system should also be installed.

3) Management Performance

The structural institutional performance criteria concluded that management performance could be achieved by measuring different indicators (Appendix -1-), which will be discussed in detail as follows:

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raelcnu

a) Availability of Organizational Structure

The municipality has an organizational structure of which the water department forms an integral part. It is a simple structure with 10 employees who are distributed according to their qualifications and skills, starting with the head of the municipality who is in charge and responsible for water department's performance, and ending with wells guards.

b) Availability of Job Description and Job Specifications

The water department does not have job description or specifications for each employee. Its constitution is also not written or documented, so that it cannot be used as a term of reference for performance evaluation for each employee. This makes it difficult for each employee to define his roles and tasks, leads to poor performance.

c) Human Resources Management (employees' qualifications, salaries, training and development)

The employees qualifications depend on their jobs, ranging from technicians who have a university degree in a related field, and ending with low-level technicians and a number of counter readers who have only secondary degree. The majority of employees are full-timers; the remainder are temporary employees, who are employed for daily and emergency tasks. Their number differs from one year to next.

The interview showed that there is only one technician responsible for operating the three wells. He controls pumping, distribution, maintenance, and other related tasks., He works long hours and sleeps in a room next to the main well. There is no one to replace him in case of emergency.

d) Salaries

Water department salaries differ each year depending on the daily wages, which increased because of the construction and maintenance of wells and networks. It was also shown that the salaries of full timers' are on the increase.

This is a result of excessively high unemployment rates over previous years. Water institutions in Palestine have been obliged to hire extra labor for the same activities. Proper training and capacity building of staff at all levels of management and performance monitoring was minimal or absent.

This has resulted in organizational, technical, administrative and logistical weaknesses, general inefficiency, over employment, and high salary rates relative to the total expenses.

e) Employee Training and Development

The municipality offers training and development courses to its employees. They enroll them in local or international training courses and workshops, . Most training programs are local and are implemented by NGOs such as GTZ and the UNDP, in addition to the training courses provided by the PWA. They focused on water resources management, proposal writing, technical skills, and fund raising.

4) Financial Performance

a) Water Tariffs

The municipal council adopted a new progressive water tariff in 2001, taking customers social and economic circumstances into consideration. Table 3.2 shows the tariff increase on water consumption rates. The cost of each cubic meter is 2.48 NIS.

Table 3.2 Water consumption tariff for Anabta municipality 2006

Category	Price / NIS/ cubic meter
6-15	2.48
16-25	2.81
26-50	3.13
51 and above	6.20

*Source: Anabta municipality 2006

This new tariff system was approved by the municipality council under the principle of cost recovery and small profit margin. It is linked to the new Israeli shekel. Value-added cost is determined by the municipal council under the services category.

b) Collection Efficiency

The water department could achieve technical efficiency through a high percentage of collection efficiency and a low percentage of customer complaints. Collection efficiency is calculated by using the following formula:

Total annual collections

Total annual billings

The collection efficiency in 2004 was 28%, increasing to 81% in 2005. Compared to 2004, the high percentage in 2005 reflects an increase in collection efficiency which is an accurate indicator and considered as a good indicator for this municipality. The ratio increased as a result of a public awareness campaign initiated by the municipality.

According to the person in charge of this municipality, customer complaints are very limited, both with regards to water quality and water quantity.

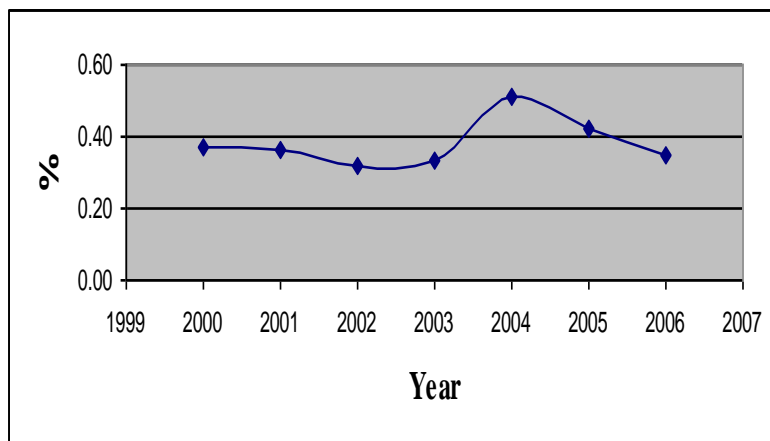
c) Accumulated Debts

The water department suffers from a large accumulated debt, equaling 945,329 NIS in 2006. These debts are a result of unpaid bills, continuous production and maintenances costs.

The accumulated debts will continue to rise unless the executive authority and the PWA evaluate current financial performance for each municipality, and take a corrective action.

d) Personnel Cost Ratio was calculated according to the following formula and presented in figure 3.3

$$\frac{\text{Sum of water department salaries}}{\text{Total expenses of water department}}$$



*Source: Anabta Municipality.

Figure 3.3 Percentage personnel cost ratio for Anabta Municipality 2000----2006

Figure 3.3 shows that the personnel cost ratio fluctuates every year. There was a strange shift in 2004: because more full-time staff and daily temp staff was hired, it reached 51%. This is high compared to other years.

There are three reasons for this:

- a. Proportional increase in staff wages, in addition to bonuses and benefits.
- b. Payment of other employee (those who do not work in the water department) salaries, as a result of lack of funds in other departments.

- c. Daily wages were increased in order to decrease unemployment rate in Anabta district.

However, these factors not in themselves do not explain the high salaries as compared to other expenses.

The personnel cost ratio should be calculated upon financial and economic efficiency. This means that personnel costs should be consistent with the service coverage area and service level. Any other problems should be solved in other ways, but not by salary increase.

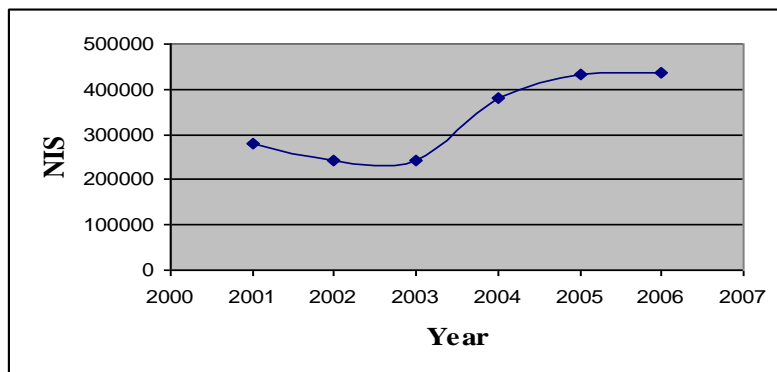
e) Profits or Losses

This water department had a decreasing profit rate, which can be ascribed to a rise in total expenses. Total expenses increased for the following reasons:

1. High salaries for water department employees compared with their number. There are only 12 employees.
2. Adding other salaries from other departments such as administrative salaries and accountants' salaries to the water department. These salaries amounted to 437,458 NIS in 2006.
3. High and increasing maintenance cost.
4. High electricity costs which are at times not consistent with supplied quantities.
5. Absence of financial audit, especially by the ministry of local governance.

Figure 3.4 shows that salaries are on the rise. Even if they are not related to the water department, the municipality places these salaries under the water department expenses, which leads to a decrease in water revenues.

This calculation shows that the water department's is financially dependent on the municipality. This goes against the principle that there should be an independent budget to be used to develop water department.



** Source: Anabta Municipality, 2006

Figure 3.4 Total salaries for Anabta municipality 2001---2006

f) Cost Recovery

A successful system of cost recovery, should add depreciation cost to total costs, such as operation and maintenance (O&M) costs, capital costs, cost of environment protection, and costs reserved for future development (Nickson, 2000). Financial reports did not show that this municipality attained cost recovery.

This municipality doesn't add depreciation costs to total costs because they can't estimate the value of assets. As a result they can't estimate depreciation costs (Anabta Municipality, personal interview, 2006).

The PWA also found that it was difficult to estimate the value of assets and they didn't set criteria for doing so. As a result, cost recovery has not been accomplished in this municipality.

g) Fund Raising Criteria

This criterion is an indicator and a reflection of the water department's current and expected activities. It is also a reflection of future needs in terms of infrastructure and water needs.

This department engages in continuous fund raising activities. They are in constant contact with funding agencies and they also have a number of completed proposals for water resources management and needs. Some of these proposals have already obtained funding, which was used to implement projects. These projects have positively influenced infrastructure and staff development (Anabta municipality, 2006).

5) Management Information System

This reflects the municipality's ability to manage available information water supply, demand, deficit, and financial data in internal bases.. These data should be recorded and archived with care, as they as many stakeholders need them for several studies.

a) Sharing National Data

Among other things, PWA representatives recommended sharing national data. The idea came as a result of suffering from a lack of information and feedback from water units and municipalities which leads to poor and weak reports.

Water department should has a full knowledge and data about other water departments activities in other villages or cities such as implemented projects, water needs, water shortage, in order to make use of this data to increase their experiences and to avoid re-implementing of these projects. This department doesn't have much information about other water departments, except a summary about water sector performance which was distributed by PWA in 2004. This lack of coordination and lack of shared data reflects un homogeneity among these water units and departments and a result re implementing of projects.

b) Coordination with PWA, Ministry of Local Governance or Other Municipalities:

A successful and efficient institutional management of water sector is to have coordination and a consistency between water units and PWA, since it's the regulator and the supervisor of water sector. These tasks depend of the availability of data base about water sector institutions and their performance. Other wise lack of information and coordination will leads to duplication of projects and mismatch between PWA data and water institutions data which also lead to lack of credibility especially for signing foreign agreements. Coordination with ministry of local governance is also important, since it's the responsible for performance evaluation, but it has been noticed that this ministry didn't visit the municipality or evaluate their financial or administrative performance since almost 4 years (Anabta municipality, personal Interview, 2006). This municipality also has a low and weak level of coordination with other municipalities. The head of the municipality should represents water department as well as other departments in joint meetings with other municipalities, but unfortunately these meetings were not held till present time. Moreover and the most important drawback, is the

lack of coordination with PWA except a few times of water quality check in addition to the late reporting of PWA which only started in 2004.

c) Data entry

This department has a computerized data entry system and good reports. Data about groundwater tables, water consumption and production are available. These data should be shared with other departments which use the same groundwater basin, like Tulkarem.

d) Availability of Master Plan and Annual Reports

The availability of master plans reflects the organizational ability to create a vision for the future, and the ability to ensure the principle of sustainability. This municipality and water department do not dispose of master plans and therefore do not ensure this principle. This reflects a lack of awareness about future needs and the principle of sustainability. The water department does have financial and technical reports, which are used as part of the yearly performance evaluation.

6) Conflict Resolution

In this department, the municipal council resolves conflicts between staff and customers. Conflicts with other municipalities are rare as there is little cooperation or information sharing.

Based on the above findings, it has been found that the Anabta Municipality has a similar poor performance level as Tulkarem municipality, except for some small differences such as Anabta's superior organizational structure. These two municipalities share the same deficiencies such as: high water losses, high personnel cost ratio, absence of job descriptions, poor coordination with the PWA, high accumulated debts and inadequate tariffs.

This municipality also needs assistance in every respect, especially in the financial and technical domains. The PWA should take corrective action in this municipality and in other municipalities as well.

Case Study No. 3 Jericho Municipality

Jericho Municipality was established in 1950. It is a non-profit organization. The water unit is part of the municipality; and function under the service department.

It consists of two sections:

- 1) Irrigation section
- 2) Drinking section

There are 15 employees who work on technical and administrative tasks. Today, the water unit's served area covers Jericho city, Ein Sultan, and Aqbat Jaber refugee camps.

The main source of water is the Ein Al-Sultan spring. It produces water for irrigation (58%) and domestic use (42%). This spring is considered to be one of the largest sources of highest quality fresh water. Its average discharge rate equals 650 m³/hour (Jericho municipality, 2006).

1) Regulation Framework:

After visiting the municipality, it was noted that a copy of water regulations and water law, which was distributed in the West Bank and Gaza Strip in 2002, is available.

However the use of these regulations as a term of reference was not apparent, as was revealed in the applied tariff system. This is determined by a regular checking of the wells (quality check), in addition to a water-quality check that implemented by PWA during the year. The municipal council controls water quality and tariffs.

2) Technical Framework

Water Supply, Consumption and Losses

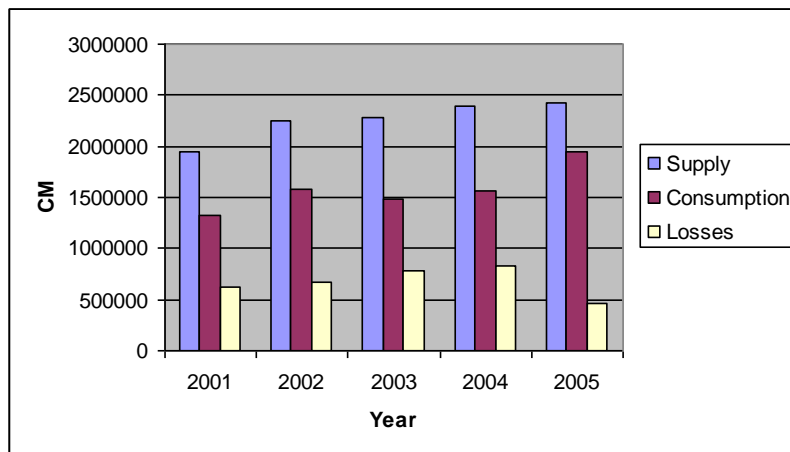
The main source of water is the Ein Al-Sultan spring. It provides water through networks that are about 45 km in length and serve a total population of about 20,000 household customers, 24 hours, 7 days a week with equity among customers.

The Jericho municipality faces increasing rates of water production and consumption as well as water losses.

Figure 3.5 presents water supply, consumption and losses in the period between 2001-2005. The annual production ranges between 1,940 million CM in 2001 (lowest rate) and 2,501 million CM in 2006 (highest rate). The increase in water production is a result of water losses

and a rising demand, especially in the summertime. (Jericho Municipality, personal interview, 2006).

Water consumption is also increasing. It reached its highest level in 2005 and 2006 respectively.



**Source: Jericho Municipality, 2006

Figure 3.5 Annual Water Supply, Consumption and Losses for Jericho Municipality in MCM (2001-2005)

Figure 3.5 presents water demand, supply and water loss rates. It clearly shows the increase in water consumption, which is partly due to decreasing rates of water losses, at 22%.

Don't you mean increasing? :[26f]Comment

The highest consumption rates were recorded during the summertime due to the high temperature in this season. It should be noted that Jericho is a tourist destination with a number of tourist facilities that consume large amounts of water.

Like other municipalities, Jericho suffers from problems of water loss. However, it was noted that Jericho municipality has a lower rate of water loss than other municipalities, and that the rate has been decreasing in the last years (Figure 3.5).

Figure 3.5 presents water losses during the period between 2001-2005. Water losses increased in the 2003/2004 to about 35%. It then started to decrease for the following reasons:

- 1) Increased control over illegal connections by customers. Customers were forced to pay for these actions.

- 2) Rehabilitation of networks. This is expensive and requires effective researches.

However, part of this network has been renewed

The impact of water losses on institutional efficiency means that a large proportion of produced water is lost. For example, if we take real water production, each consumer will consume 351 l/c/d, with zero water losses. However this water consumption will reduce water consumption to 273 l/c/d.

The average per capita consumption rate in Jericho ranges between 200 to 273 l/c/d compared with 80 to 100 l/c/d in the West Bank. This means it is higher than the international average rate of 150 l/c/d. This difference can be explained through the following reasons:

- 1) High temperature especially in summertime.
- 2) Using of municipal water for irrigation of gardens.
- 3) Cheap prices of water.

The main causes of the water losses are similar to those in the other municipalities. They can be classified in two categories:

- 1) Network leakage: part of the network was not renewed, since it is very costly and the required investment cannot be covered by water revenues. Rehabilitation of the water networks is therefore mainly dependent on foreign donation. Leakage from the network represents only 20% of the total loss.

- 2) The main cause of water losses is illegal practice by consumers such as the manipulation of counters. Around 70% of the water losses are caused by such actions, a very high percentage compared with water prices. This will be discussed later.

To deal with this problem, the municipality is planning to take the following actions:

- 1) Renew the network. This is the most important but also the most costly action.
- 2) Monitoring customer's behaviors.
- 3) Raising public awareness.

Total water consumption is increasing each year, in spite of the previous problems, which creates additional challenges for this municipality.

3) Management Performance

According to the structural institutional performance criteria, management performance can be achieved by measuring different indicators. This will be discussed in detail as follows:

a) Availability of Organizational Structure

This municipality has an available organizational structure and the water department is part of this structure. They have 15 employees, distributed according to their qualifications and skills, starting from the head of the municipality who is the person in charge and responsible for water department performance, and ended with wells guards.

Organizational structure consists of 7 main departments and 16 sub-departments. These departments are responsible for operational, maintenance, environmental, and IT activities

b) Availability of Job Description and Job Specifications

Employees working in the municipal water department all have job descriptions and job specifications. These descriptions and specifications are written and documented and used as a term of reference for performance evaluation for each employee.

c) Human Resources Management (employee's qualifications, salaries, training and development)

Employee qualifications in this water department depend on the job, Examples of these jobs are:

1. Site engineer,
2. Technicians,
3. Counter's readers

There is no research and development or planning. The majority of employees are full-timers; the other temporary employees are hired to finish specific and emergency tasks.

In terms of employee training and development, the municipality offers training and development programs. The majority of these programs are funded by external agencies such as GTZ, the UNDP, the PWA, or other governmental organizations.

Water department employees need the following skills, for which they receive training as well: water resources management, proposal writing and fund raising.

4) Financial Framework

a) Water Tariffs

Table 3.3 below presents the water tariff system applied by Jericho municipality, for different water consumption categories. The cost of one cubic meter is NIS 0.5. It is sold according to the consumption categories They use their own tariff system, and do not apply the PWA tariff system.

Table 3.3 Water consumption tariff system for Jericho municipality

Category	Price / NIS/ m ³
0-150	1
151-250	2
251 and above	3

*Source, Jericho municipality.

This tariff system was approved by the municipal council. There are no clear terms of reference and there is no economic basis. The water tariff system applied by this municipality does not cover operation and maintenance costs.

Water prices in the Jericho area are considered to be the lowest in the West Bank.

The efficiency of this water department can be measured according the following major indicators:

- a. High percentage of collection efficiency
- b. Low percentage of customer complaints

b) Collection Efficiency

The collection efficiency of the bills can be calculated using the following formula:

Total annual collections

Total annual billings

Jericho municipality had a collection efficiency ratio of 74.13% in 2005, which is a good value compared with other municipalities. This could be a result of cheap water prices.

The absence of any legal or executive authority that forces customers to pay their bills, in addition to the lack of public awareness of the water crisis, form major obstacles toward increasing collection efficiency.

Customer complaints are another indicator of water department efficiency. There are few customer complaints and they are not documented. This can be explained by the availability of water and cheap prices.

c) Accumulated debts

Like other municipalities, the water department in this municipality has a large accumulated debt, equal to 3,434 million NIS. The high rate of accumulated debt reflects the municipality's inability to collect bills, especially from the refugee camps. It also reflects the absence of legal and executive authority that can force customers to pay their bills. Lack of public awareness forms an additional challenge.

d) Personnel Cost Ratio

This ratio is calculated according to the following formula:

Sum of water department salaries

Total expense of water department

Personnel cost ratio equaled 63% in 2005. This is considered to be a high ratio since it makes up for more than half of total costs. It is a result of the decreasing operational costs, which the lowest in the West Bank as Jericho produces its own water and does not need to purchase water.

e) Profits or Losses

The water department in this municipality provided financial data for this study. The data was provided by the PWA and only covered 2005. It showed that the department's profits came to 1,341,780 NIS – a good amount for one year.

One of the major obstacles to using these funds to improve water department is the department's financial dependency on the municipality and the fact that profits are shared with other departments.

This financial problem goes against the recommendation for institutional prerequisites for success. It stated that water organizations can only execute their functions if they have access to an appropriate financial, political, and economic base to expand and maintain their

infrastructure, attract qualified professional funds, and prepare for the future (WHO,UNEP, 1997).

f) Cost Recovery

One of the major results of the performance evaluation that was recommended by the PWA is that each water unit or department should be able to attain cost recovery. This principle is a measure of financial efficiency which reflects the water department's ability to estimate the value of their assets and as a result of estimated depreciation costs.

This municipality doesn't add depreciation expenses to total expenses, as they don't have accurate criteria to estimate their value. It just covers the operational costs, and does not have a reserve for depreciation or emergency needs. In addition, there was also no criterion for estimating the value of assets.

e) Fund Raising Criteria

Another indicator of financial performance is the availability of fund raising criteria implemented by each water department. This department has a special committee to implement this task. It is made up of the head of each department, in addition to the representative of public relations department. They meet on a regular basis to evaluate the municipality's needs for future projects. The head of water department is a member of this committee (Jericho Municipality, personal interview, 2006).

They share their ideas and jointly contribute to the writing of proposals. They obtained several funds from different agencies such as UNDP, GTZ, UNESCO and ANERA.

5) Management Information System

a) Managing Information between Jericho Municipality and the PWA:

According to Nickson (2000), water management should be based on a participatory approach involving users, planners and policy makers at all levels, with decision-making taken at the lowest appropriate level according to the concept of subsidiary.

The PWA has a supervisory role over this municipality. The municipality has to provide them with monthly reports about water production. This happens in addition to water-quality

checks which are implemented by the PWA. The reports that were provided to PWA in the last 4 to 5 years, reflect a lack of coordination between these two institutions.

b) Sharing National Data:

The water department should have full knowledge and data about the activities of other water departments in other villages or community councils in the same district. This department is the largest in the Jordan Valley area. The next largest community council is Al-Uja council. There is very limited sharing of data and information with this council.

c) Coordination with the PWA or Other Municipalities

As mentioned above with regards to the participatory approach, it is important for successful and efficient institutional management of the water sector to have coordination and consistency between water units which share the same interest, problems and challenges. This municipality has a low level of coordination with other municipalities and community councils. Coordination was very weak, even during joint meetings. More importantly, except for the occasional water-quality check by the PWA, there is a lack of coordination with this body. Reporting to the PWA only started in 2004 (Jericho Municipality, personal interview, 2006).

d) Data Entry

This department has a computerized data entry system and accurate reports about water production, water consumption, and water losses. However, it has a weak financial system.

e) Availability of Master Plan and Annual Reports:

A master plan is important for future water management and show that the water department ensures the principle of sustainability. The water department has a master plan for the coming 10 years. It includes data about water needs, estimated water supply and demand. (Jericho Municipality, personal interview, 2006).

6) Conflict Resolution

In this department conflict resolution is implemented by the municipal council, for both internal and external conflicts.

According to previous findings and information, one can conclude that Jericho municipality is facing problems like other municipalities. These problems can be summarized as follows: high water losses, high water demand, cheap water prices, inefficient tariff system, high accumulated debts, high personnel cost ratio, and medium collection efficiency.

However, Jericho municipality forms an exception as it is rich in water resources. These resources should be managed efficiently; the water department should be evaluated; and financial records should be audited.

There should also be increased public awareness and executive action towards non-paying customers

Case study No.4 Jerusalem Water Undertaking

The Jerusalem Water Undertaking (JWU) for Ramallah and Al-Bireh district is a non-profit, independent, civil organization. It was established in 1966 during the Jordanian Rule of the West Bank. Law No.9 was issued in that year providing for the establishment of an Undertaking under the name of Jerusalem Water Undertaking.

The JWU is charged with providing all water needs for drinking and other municipal and domestic purposes. It is empowered to develop new water resources and control all water projects in the area.

According to the stated law, the JWU was authorized to prescribe water tariffs, the cost of services, collection procedures, as well as financial, administrative and technical regulations (JWU, 2006).

Service Area:

The served area of the JWU extends over 600 square kilometers. It covers significant parts of Ramallah and Al-Bireh Governorate (Ramallah and Al-Bireh twin cities, 8 other cities/ towns, more than 35 villages and 5 refugee camps) and the northern part of Jerusalem.

The number of subscriptions is about 46,170, serving a total estimated population of 280,000 people. The remaining localities in Ramallah and Al-Bireh Governorate are either supplied with water by the West Bank Water Department or are not yet served. (JWU, 2006).

JWU is an independent and non-profit organization with the following objectives:

- Develop, protect, preserve and manage its water resources to ensure their sustainability and adequate future water supply.
- Balance water supply and water demand to ensure an equitable share of available water quantities to all consumers.
- Through effective financial management, apply a tariff that covers operating and maintenance as well as capital costs for the long term and considers affordability to customers in order to ensure continuity of service and continued self-reliance.

- Professional management that is based on effective, up-to-date management principles and practices.
- Provide prompt and effective services to JWU customers in a manner that preserves the JWU image as a community supporter and maximizes public interest, participation, and support (JWU, 2006) .

1) Regulation Framework

The JWU applies its own laws and regulations in terms of water quantity and quality. The aim of JWU is to ensure the supply of clean and hygienically safe water to its consumer and to remain vigilant in case of any water-quality problems. The JWU regularly samples and tests its supplied water at all sources and at different locations of the distribution system.

In addition, the PWA also regularly conducts a quality check during the year. The administrative council is responsible for controlling provided water quantities and water quality.

2) Technical Framework

Water Supply, Consumption and Losses

Due to the status of the basin and certain hydro-geological factors, the Ein Samia well-field (eastern sub-basin) is the only water source owned by the JWU. It contains 5 wells. The Ein Samia well-field is located about 20 kilometers north-east of Ramallah. It lies at an altitude of 445m above sea level. Total production capacity of the Ein Samia field well is about 7.5 MCM/Y(JWU, 2006).

There are 5 wells in the Ein Samia well-field owned by the JWU. They produce 20% of the water distributed to the served area, while the remaining 80% of water is purchased from the Israeli company "Mekorot".

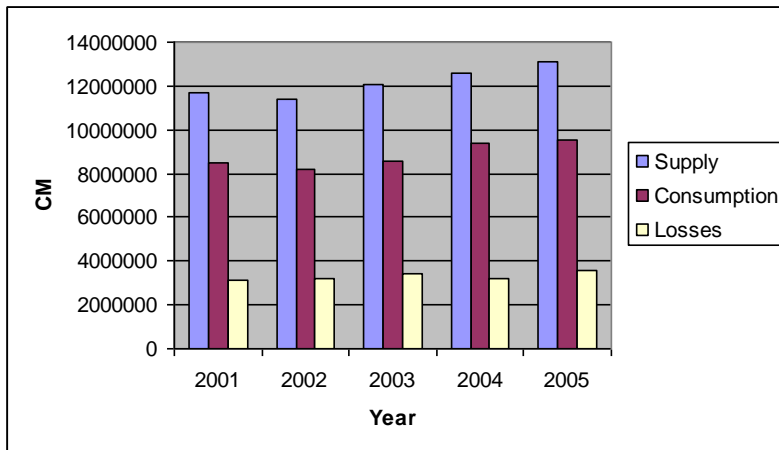
This strong dependency on Mekorot has put water resources management and control in the hand of the Israelis, who can reserve water resources by **power** and leads to severe water crises.

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A remote control and monitoring system was also developed to control and monitor water flow and regulate pressure in the JWU supply and distribution network (JWU, 2006). The JWU provides water through a network that is about 1,044,938 km in length. The JWU has data about water supply, consumption and water losses for the period between 1974 and 2005.

Due to population growth and water losses, consumption is increasing every year. Figure 3.6 presents the annual water supply, consumption and losses for the people served by the JWU during the period 2001-2005. It reflects continuous increase in water consumption due to the increase in population, economic growth, and as a result of the increase in subscriptions.

While consumption is continuously increasing, water losses are on the rise, leading to an increase in the accumulated annual deficit.



**Source :JWU,2006

Figure 3.6 Annual Water Supply, Consumption and Losses for JWU in CM 2001 ---2005

Water consumption has doubled in the period between 1990 and 2004, indicating a growth in consumption. This can be partly ascribed to an increase in population following local migration from other villages and cities to Ramallah and the Al- Bireh district. It was also noted that water consumption decreased in 2000 and 2003, reflecting the impact of the recession and the slow economic growth during that period.

Water Losses

The JWU was established in 1966, and since that time, it provides water to customers using the same networks. As a result it has a water loss rate (33% in 1974; 27% in 2005), which is however still lower than that of small municipalities like Anabta and Tulkarem. (JWU, 2006).(Figure 3.6).

The main reasons for water losses are:

- 1) Leakage in the main JWU-controlled network between the water source and the beginning of the distribution network. This is a result of corrosion of the pipes, and also of water pressure. This percentage is small.
- 2) Network leakage is high. It is a result of a yearly deterioration in the networks.
- 3) Deficiency of meters, which increased the rate of unaccounted for water to 11.3 %. This means that about 11.3% of the consumption reaches the consumers for free.
- 4) Illegal practices by consumers. These practices are limited and controlled by the JWU.

The effect of water losses on water consumption leads to a reduced consumption ratio. Taking 2005 as example, one can see that water consumption would have been 131 l/c/d if all water produced had been consumed. Water losses lowered the consumption ratio to 96 l/c/d. Both ratios are still lower than the recommended consumption ratio by the WHO, which is 150 l/c/d .This means that water production is increasing every year, but that the additional water is not reaching customers.

In order to cut water losses and recognize the importance of unaccounted for water, the JWU has embarked on an ambitious plan. This plan consists of:

- 1) Rehabilitating the obsolete networks.
- 2) Establishing a leak detection unit, using detection equipment.
- 3) Utilizing relevant software.
- 4) Implementing pressure management measures including the installation of district meters.

3) Management Performance

Management performance can be achieved by measuring different indicators, which will be discussed in details as follows:

a) Availability of Organizational Structure

This reflects the institution's ability to formulate, implement, and evaluate the work according to each job description and needed tasks.

The JWU has an organizational structure which consists of 5 main departments and 31 sections. They implement a variety of jobs such as IT, finance, management, production, engineering, operations management and quality control.

All these departments and sub-departments report to the general manager of the JWU and the administrative council.

b) Availability of Job Descriptions and Job Specifications

Following their efforts to attain high administrative and technical performance, the JWU adopted new job descriptions and specifications for each job. They are used as a terms of reference for performance evaluation.

The fact that job descriptions are part of the JWU's organizational development strategy, reflects the department's ability to divide jobs and assign tasks to each employee. This creates a clear chain of command and also prevents duplication of tasks.

c) Human Resources Management (employee qualifications, salaries, training and development)

The JWU has 196 employees distributed according to the abovementioned organizational structure. 27% of those employees have a university degree, 17% have a diploma, and the remaining 55% has a secondary degree. The JWU believes that the long work experience of employees is as important as having an academic degree.

Employee training and development started seriously in 1998 when the JWU adopted the new administrative development process, of which human resources management formed the core. One result of this process was the establishment of an independent human resources section, which manages all human resources tasks and activities. JWU employees received many chances to participate training and development through local and international symposiums and workshops.

Available information regarding salaries shows that employee salaries equal about 27% of the total expenditures. This is considered to be a rational ratio compared with their number and the coverage area (JWU, 2002). (The international rate for developing countries is around 27%).

4) Financial Performance

a) Water Tariff

The JWU adopts a progressive water tariff that takes social categories into account and facilitates the payment of water bills (Table 3.4). This tariff increases proportionally with the increase of consumed water quantities (JWU, 2006).

Table 3.4 Water Consumption tariff system for the JWU

Category	Price / NIS/ m ³
0-10	4.1
11-20	4.6
21-40	4.85
41-100	6.30
101 and above	6.85

*Source: JWU, 2006

The process of water meter reading and bill issuing has been developed recently by using data terminals, which allows the reader to read the meter and issue the bill immediately on site. This facilitates work and increases work efficiency.

b) Collection Efficiency

The collection efficiency of the bills can be calculated with the following formula:

Total annual collections

Total annual billings

Collection efficiency reached a very high ratio during the period between 1995 and 2000. It was about 95% in 2000, and decreased to 88% and 77% in 2005 and 2006 respectively. This was due to the previous and current social, economic, and political conditions in the West Bank, which resulted in a high number of unpaid bills, especially in refugee camps and villages. These conditions reflect the lack of public awareness among consumers regarding their obligations. It also reflects that collection efficiency will continue to decrease if these conditions persist.

c) Accumulated Debts

Like other utilities, the JWU had an accumulated debt of around 7,778 million NIS in 2005. The majority of these debts are a result of unpaid bills, high operational costs, especially purchased water.

d) Personnel Cost Ratio is calculated according to the following formula:

Sum of water department salaries

Total expenses of water department

Personnel cost ratio is an indicator of personnel costs compared to other costs. It was around 27% in 2005. This figure is rational, for such a utility and in this service area.

e) Profits or Losses

Available data for profit and losses for the year 2000 show that net losses were about 1,026 million NIS. In the meantime available information for year 2005 indicates that net profits were 2,844 million NIS, which can be considered to be a good indicator for this utility especially under the political and social circumstances. These profits were a result of high water prices compared to other municipalities

f) Cost Recovery:

Performance evaluation criteria for water providers concentrate on cost recovery. It can be assessed by the ability to cover operational and maintenances costs, the ability to have a reserve fund for the future, the cost of environmental protection, and also the ability to estimate the value of assets and as a result to add the depreciation cost.

Available financial data from the JWU show that operation, maintenance and depreciation costs are included in their financial report. On the other hand, environmental protection costs and reserves for the future are not included.

Every year, the JWU includes depreciation costs, to the expenses which reflect the realistic financial situation.

g) Fund Raising Criteria:

The JWU depends on two funding resources, both internally and externally. They are:

- 1) Internal revenues, which are used to cover operational and maintenance costs, in addition to development projects and network rehabilitation.
- 2) As for investment and development operations, they are financed largely through external aid and grants, mainly from the German Government through GTZ. Other organizations include the UNDP, World Bank and French Government.

The JWU could be considered to be an active utility for fund raising on the grounds of its ability to implement important development projects. Fund raising is the responsibility of the general manager and the board of directors.

5) Management Information System and Coordination with the PWA

a) Managing information systems and sharing national data between JWU, PWA and other water departments

The JWU has along experience in water management, which is why it helps other municipalities and water departments when needed, especially on the technical side. It has a good management information system, which can provide reports and publications. Meanwhile, the JWU has a good coordination with the PWA, and the head of the PWA is a member of the JWU board of directors. It provides the PWA with all requested data. It doesn't share data or vision with other municipalities about water needs consumption and production, despite the fact that they share the same basin.

b) Data Entry:

The JWU has a computerized and modern data entry system that leads to accurate and up to date reports. It has data about water production, consumption, and water losses since 1974.

c) Availability of Master plan:

The JWU has a master plan for the coming period. It contains research about water and developments needs. This plan helps the utility in fund raising and water demand estimation.

The JWU also pays special attention to public awareness: Every year, it organizes different activities and publications to raise public awareness and create a national consciousness about

the value of water and the importance of conservation. It aims to control human activities to ensure the conservation of both water quantity and quality.

The public relation division of the JWU conducted awareness campaigns in order to sensitise the attitudes and behavior of people towards the importance and scarcity of water. The JWU targeted different cultural groups school children.

6) Conflict Resolution:

JWU has managerial criteria for conflict resolution. It forms special committees, depending on the level of the problem. On the other hand, the JWU has formulated special teams for emergency needs, and also it provides alternative employees when needed.

The previous data and the available secondary data about JWU, it could be concluded that this utility is an independent utility in all aspects. It has a good performance comparable with other municipalities. This good performance is reflected by the medium water losses, the low personnel cost ratio, the availability of organizational structure in addition to the availability of job descriptions and specifications as well.

The JWU has a good performance as a result of cooperation work with GTZ, which provided them with necessary technical administrative and organizational training and assistance. The most important challenge facing the JWU is the high cost of water (especially the purchased water) and the medium collection efficiency as a result of high prices for water.

However, data and report sharing the PWA and other water organizations, which is an important component of institutional performance, is at a minimum.

It can be concluded that the JWU needs help to raise public awareness among customers who fail to pay and customers who steal. Palestinian Authority regulations could help in this respect.

Case Study No. 5 Water Supply and Sewerage Authority (Bethlehem)

The WSSA is a public corporation, which was created in 1963 when the Jordanian government established the water authority for Bethlehem, Beit Jala and Beit Sahour.

Since the Israeli occupation in 1967, the Israeli Authority, the West Bank Water Department controlled all water production and distribution. The Water Authority was not allowed to drill or develop new wells and the water supply was monopolized by the Israeli company Mekorot.

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The WSSA is divided into two main departments: the water department and the sewerage department.

It provides water to the main municipalities, Bethlehem, Beit Jala, Beit Sahour, Al- Dawha, and Al-Khadir, as well as the main refugee camps: Al- Dhasheh, Ayda, and Al-Azeh, and 10 villages' councils. The other areas are provided with water by Mekorot or the West Bank Water Department. Water is provided to 100,000 consumers through networks of around 300 km.. The daily distribution volume is about 10,000 m³.

1) Regulation Framework

The WSSA has its own internal control system, which was approved by the administrative council that is composed of the heads of the related municipalities and the head of the WSSA. The PWA has a legal and controlling role over this utility, especially in the case of pollution. The ministry of local governorate also has partial control, but the main lies with the WSSA itself. (WSSA, personal Interview, 2006).

2) Technical Framework

Water Supply, Consumption and Losses

Bethlehem district is one of the richest areas in terms of groundwater resources, but unfortunately most of these resources are totally controlled by the Israeli company Mekorot .

The WSSA has two major water resources, they are:

- **Old resources :**

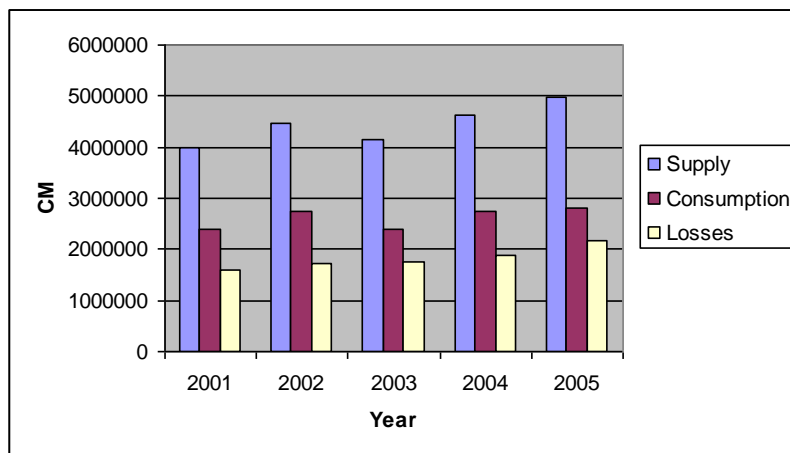
These resources are entirely controlled by Mekorot, which controls 5 wells, which have a pumping volume of about 200 m³/hour. One additional well is controlled by the WSSA (Beit Fajjar well). It is located 15 km south of Bethlehem and has a production capacity

of 235 m³/hour. This well provides 80% of the WSSA’s total water supply. All water from the Biet Fajjar pump station is pumped into the Mekorot network.

- **New Resources:**

These resources became available after the peace agreements. A number of wells have been drilled and put into operation, which has helped reduce the water crisis. Bethlehem district’s daily demand for water equals about 30,000 m³/day for household use, but unfortunately only half of this quantity is provided by Mekorot, especially during summertime, which leads to a severe water crisis. This situation is worse in the hilly areas that lies around 800m above sea level (WSSA, 2006).

Water is provided to consumers on a share basis. The quantity depends on the topography of the service area, the infrastructure and the water sources. This means that there are areas with 24 hours water availability and others that don’t have this availability. Like other other water utilities, but also because of the large service coverage area, the WSSA faces an increasing in water supply due to population growth and consumption (Figures 3.7).



**Source: WSSA, 2006

Figure 3.7 Annual Water Supply, Consumption and Losses for WSSA in MCM (2001- 2005)

Figure 3.7 presents the continuous increase in water supply and demand due to the increase in population, economic growth, and as a result an increase in number of subscriptions.

But since WSSA cannot regularly purchase water from Mekorot, and since there are certain peaks for water consumption over the year and over the day, customers are constantly suffering from water shortage.

The major problem that faces WSSA is that customers try to avoid paying their water fees; this limits the available funds for rehabilitating the poor network and for supplying more water. This also leads to an increase in water losses.

Water Losses:

The WSSA suffers from the same problem of water losses as other municipalities (about 46% in 2006). Figure 3.7 presents the difference between water supply and water consumption as read at the individual water meters is called unaccounted for water (water losses). The ratio of water losses is extremely high and it reached around 46% in 2006. In normal circumstances the ratio should not exceed 20%. There are several reasons for the high ratio of water losses:

- a) Losses in the network; leakage, damaged pipe lines, pipes bursting due to the high water pressure, ageing of the network, etc. This accounts for about 10-15% of water losses.
- b) Losses in and around the water meters: meter failures, meter inaccuracy, outdated meters, broken meters, etc. This accounts for about 30%
- c) Losses due to manipulation; illegal consumption of water, meter, water usage without meter, failures in meter reading, failures in the accounting. This accounts for about 55%.

The WSSA has started a program to reduce water losses as follows:

- a) Leak detection, on a regular basis.
- b) Rehabilitation of the networks, part of this program is already being implemented, but it requires high investment.
- c) Faster reaction to pipe damages.
- d) Dealing with illegal consumers, and reporting their names and addresses to the WSSA.
- e) Raising public awareness.

Water losses have a great impact on both water production and consumption. If one takes 2006 as an example, one can see that water consumption with zero water losses would have been about 110 l/c/d. However, water losses reduce actual water consumption to about 60

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l/c/d. This leads to a continuous increase in water production. Water scarcity will also increase if the water losses continue to rise.

3) Management Performance

Management performance for water utilities can be achieved by measuring different performance criteria They include:

a) Presence of an Organizational Structure:

The WSSA has an organizational structure. It consists of 6 main departments and is a result of 43 years of development. Supervised and guided by the council, the general management has to operate the WSSA and to implement routine work within an approved budget and within the policy framework established by the council (WSSA, 2006).

The water department is the largest department, employing more than 50 employees and workers. It is part of the current organizational structure and has 4 sections:

- Operators, who have the responsibility for pumping water and operating the pumping stations.
- Distributors, who have the responsibility for distributing water through the different pipelines and to different areas, to ensure that the consumers are supplied with water on a regular basis and on an equal basis.
- Pipe layers or fitters, who hold the responsibility for repairing and maintaining the existing water network and establishing new connections.
- Meter mechanics who check, clean, adjust and repair water meters.

The water department is divided into two sections: water operation and distribution on the one hand; and maintenance, repair, pipe installation and mechanical work on the other.

b) Availability of Job Descriptions and Job Specifications:

The WSSA provides its employees with job descriptions and specifications, even though they are old. They are used as a term of reference for performance evaluation.

Staff members have been provided with job descriptions to clarify the functions and duties of every single employee and to help replace employees in case of absence. It also helps to reduce overlapping duties or unclear responsibilities.

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c) Human Resources Management (employee qualifications, salaries, training and development):

The WSSA employs 85 permanent staff members and laborers. Fifty of them are employed in the water department. The majority of the employees are middle-aged. Their skills and qualifications depend on the job level. There are also temporary employees who are employed to finish special daily tasks.

The WSSA is planning to implement a development plan, which is supposed to rationalize the workload and its procedure so as to reduce the number of staff. But due to the current political and economical conditions, this plan has been delayed in order to avoid inflicting hardship on people who are already suffering (WSSA, 2006).

In order to be able to achieve the aforementioned plan, this utility has invested in its current employees especially the efficient ones. They enrolled them in local and international training courses and development programs.

4) Financial Performance

a) Water Tariff

The WSSA applied its own tariff system which was approved in 1994. It is applied to all consumption categories, which means that this system deals with customers in the same way, whether it is for household, industrial or commercial use (Table 3.5). This system was approved by the board of directors. It was not based on an economic, accounting, or cost recovery basis.

The utility buys each cubic meter at 2 NIS and sells it for 4 NIS, in spite of the consumption ratio.

Table 3.5 Water Consumption Tariff System for the WSSA

Category	Price / NIS
0-10	48 (constant)
11 and above	4/ m ³

*Source: WSSA, 2006

This water utility differs from the previous case studies in terms of water tariff. It doesn't rely on a water consumption category, which encourages customers to consume more water since they have to pay the same price. As a result water bills will be high, and collection efficiency will decrease if customers refuse to pay.

b) Collection Efficiency:

Present economic, political and social conditions affect the collection efficiency for public utilities. Customers believe these services should reach them for free and that the government is responsible for this.

There are several important reasons for this, including the counter reader the economic situation, and the types of areas served such as refugee camps, which have the lowest collection efficiency ratio (Table 3.6).

The collection efficiency has started to decrease since the start of the Second Intifada, and the ensuing social, economic, and political conditions.

Collection efficiency can be calculated by using the following formula:

Total annual collections

Total annual billings

Table 3.6 Percentage of Annual Collection Efficiency for the WSSA 2002-2006

Year	2002	2003	2004	2005	2006
Total annual billing/million NIS	5,380	7,392	7,081	7,723	7,463
Annual collection/million NIS	2,439	2,385	2,744	2,819	2,821
Collection efficiency	45.34%	32.28%	38.75%	36.50%	37.81%

*Source, WSSA, 2006

Table 3.6 shows that total annual collection efficiency ranged between 45.34% in 2002 (highest value), and 32.28% in 2003 (lowest value). All these values are low and underscore the difficult situation that the water utilities are in.

Present data from the WSSA shows that 10% of all water meters are presently disconnected, some for technical reasons, but mostly because consumers are not able to pay the water bills. Although the WSSA has tried to avoid social hardship, quite a few of the water consumers still believe that water should be supplied free of charge and simply refuse to pay. The WSSA has considered this attitude to be unacceptable, and therefore they are often forced to use the drastic measures like disconnecting customers from the network and reconnecting once they pay the bills (WSSA, 2006).

The WSSA is a legal entity which is allowed to take action including concluding contracts, taking over or transforming ownership of immovable property and receiving credits or donations. Further more the WSSA is authorized to collect water and sewage fees. Its annual draft budget, which contains an estimate of the revenues and expenditures, has to be approved by the council.

The WSSA depends on two main sources of revenues:

- Water and sewage fees to cover operational expenditure.
- Local and foreign donations to cover investment projects.

c) Accumulated Debts:

The most serious problem within the revenues budget is the fee collections. Quite a high percentage of customers refuse to pay water bills, but at the same time they can pay the other bills such as telephone and electricity. The current and past political situations has made it very difficult to enforce the law.

These difficulties increased the amount of accumulated debts to around 38,701million NIS in 2006. Most of these debts came from governmental organizations and ministries.

d) Personnel Cost Ratio is calculated according to the following formula:

Sum of water department salaries

Total expense of water department

Personnel cost ratio is an indicator of personnel costs comparable with other costs. At the WSSA it equaled about 9.1 % in 2006. This number is rational, for such a utility within this service area, but at the same time it is low with respect to the the high cost of water supply.

The personnel cost ratio is very low compared with other costs.

e) Profits or Losses:

As mentioned before in the context of collection efficiency and its effect on profits or losses, revenues from fee collections don't cover operational costs (Table 3.7).

Table 3.7 Total annual profits or losses for the WSSA, 2002-2006

Year	2002	2003	2004	2005	2006
Total revenues/million	13,66	12,52	13,17	15,93	12,55
Total expenses /million	16,71	15,60	20,28	20,29	18,07
Total losses	(3,05)	(3,08)	(7,11)	(4,36)	(5,52)

*Source: WSSA, 2006

Additional reasons for losses are:

1. Increase in energy and operational costs compared with sum of revenues.
2. Deficiency of the applied tariff system, which is outdated and does not depend on an economic basis.
3. Adding other expenses, which are not related to the water department's total expenses.
4. Adding a random and at the same time high number of depreciation expenses which leads to increase total expenses.

e) Cost Recovery:

Performance evaluation criteria for water providers concentrate on cost recovery. It can be assessed by the ability to cover operational and maintenance costs, the ability to have a reserve fund for the future, the cost of environmental protection, and also the ability to estimate the value of assets and as a result to add the depreciation cost.

Available financial data for the WSSA shows that operational, maintenance and depreciation costs are included in their financial report. On the other hand, environmental protection costs, and reserve for the future are not included.

The WSSA included depreciation costs every year. This cost is a random estimation for depreciation which does not depend on a correct accounting basis. It can be added just to raise the expenses since this utility is considered a non-profit utility.

f) Fund Raising Criteria:

The WSSA has a special situation in terms of dependency on Mekorot for water resources in addition to a high percentage of water losses. These problems are combined with other financial problems. Great efforts are therefore required to find new financial resources.

The WSSA has fund raising criteria. This is the responsibility of the financial manager and the head of the utility. They obtain funds from foreign agencies such as the UNDP, GTZ, and the World Bank. Most of these funds were used for rehabilitating the networks.

5) Management Information System

a) Coordination with other Municipalities and PWA

It is important for any water utility to have an efficient management information system, in order to make sure that the data are available in each department. It is also important to have a management information system between the WSSA, the PWA and the ministry of local governorate. This information is needed to make sure that water resources are managed in an efficient way. The WSSA has a joint council for the three municipalities under its responsibility. This council held regular meetings to follow up the work and discuss problems.

Data from the PWA in 2004 shows that the WSSA provided financial data to the PWA. This data was only covered 2004 and was barely organized. It has to be modified and audited by the PWA as it was not accurate (PWA, 2006).

The WSSA was one of the utilities that received recommendations in the 2004 PWA report. The report said that this utility needs an urgent financial and operational audit, especially for the applied tariff system (PWA, 2006).

However, despite the fact that this utility is under the direct supervision of the ministry of local governorate and despite the fact that the head of this utility is a representative of the ministry of local governorate, it does not report to the ministry.

b) Data Entry:

The WSSA has data for operational and maintenance costs. It also provides computerized and documented data for water supply and demand.. The PWA reported that this data needs modification and auditing (PWA, 2006).

c) Availability of Master Plan:

The WSSA has a master plan for water demand, water supply and water needs. This plan was prepared and includes data for water needs until 2020. Part of this plan was implemented; the other part was delayed as a result of political and economic situations.

6) Conflict resolution and shared vision management:

Conflict resolution for this utility is implemented mainly by the WSSA council and partially by the ministry of local governorate.

Based on previous information, one can conclude that the WSSA has a weak institutional performance, especially in the technical, managerial and financial frameworks. It has high water losses, old and an efficient tariff system, low collection efficiency, comparatively old employees and low accuracy of financial data. T utility is also considered to have the least contact with the PWA. Accurate financial and other data is missing in the PWA records.

This utility reflects a weak performance that should be taken into consideration by the PWA, especially if they are going to implement the proposed model which includes the establishment of new regional utilities.

3.2 Summary of the assessment (The five case studies)

The previous case studies have shown that the organizations operating the Palestinian water sector suffer from several constraints and deficiencies, which if dealt with in an appropriate manner, could result in increased efficiency within the organizations and a consequent improvement of the services provided by the water sector. The following constraints and deficiencies are interrelated and prevent the implementation of water resources management plans in Palestine including:

1) Financial Problems

- a) **Limited financial resources:** Most water institutions have financial problems and continuous financial losses. In addition, water agencies and institutions have inadequate technical, institutional and legal capacities..

- b) **Low collection efficiency:** This can be ascribed to the absence of any legal or executive authority that enforces the law, but also to the current social, economic and political conditions.

- c) **Lack of funds:** Most water-related institutions suffer from severe financial deficits and lack of funds, which limits both development and the extent and quality of delivered services. The main reasons for this situation are the lack of investment or poor investment in the water sector. This in turn increases dependency on foreign funds, especially for the rehabilitation of water networks.

- d) **Lack of modern financial programs:** Water institutions, including water departments and municipalities, rarely use modern financial programs, nor do these institutions employ qualified staff for this purpose.

- e) **High accumulated debt:** Water institutions have decreasing rates of collection efficiency, high salaries, water losses and high costs of producing and distributing of water services. This created a high accumulated debt and financial losses.

f) **Different tariffs and pricing procedures:** The various water utilities currently implement different water prices without clear terms of reference or an established basis for setting the prices. Often water bills do not even cover operation and maintenance costs, which means that water utilities are generating losses. In certain areas, water losses reach 50%, resulting in relatively high water prices and making it impossible for water utilities to achieve cost recovery.

g) **Cost recovery and operational performance:** Case studies showed that cost recovery including operation and maintenance costs, capital costs, and the cost of environmental production are not included. The methods for calculating unit costs and prices are not uniform. Most water utilities or departments do not keep proper financial records or asset registers.

2) Managerial and institutional problems

a) **Overlap of roles and responsibilities:** Within the context of water resources management and institutional development, water-related institutions suffer from a lack of coordination and integration among stakeholders. Most of the existing coordination instruments are related to short-term activities/projects and generally speaking there is a lack of sustainability and empowerment.

b) **Lack of shared vision management:** The majority of stakeholders encourage the reform of the water sector's institutional structure, but they ruin the political will and good governance and strategic framework to implement this change. This leads to a lack of shared vision management of water sector.

c) **Absence of communication channels:** This limits the ability of local governments and public organizations such as PWA to formulate or implement local and operational plans or to participate in decision making. Furthermore, inefficient local administrative structures and lack of awareness of water end-users minimize the opportunities to achieve operational institutional efficiency.

d) Lack of coordination between the PWA and water departments and municipalities:

This leads to **desperation**, inadequate information, duplication of work, lack of trust and as a result poor data and reports.

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e) Absence of planning culture: This is a result of a lack of coordination and weak communication channels between water-related institutions, in addition to an absence of a shared vision management.

f) Structural Problems: The majority of water units and departments don't have an organisational structure, job descriptions or job specifications.

g) Human resources constraints: Hiring of extra labour, lack of proper training and capacity building of staff at all levels of management, leads to organisational, administrative and logistic weakness, in addition to high salaries for employees compared with other expenses.

h) Dependency of water departments: The majority of water departments depend on municipalities and don't have financial or administrative independency. This means they have become part of the poor system of shared profits and losses, which increase debts and salaries.

3) Technical Problems

a) Increasing rates of water demand: The water sector faces a continuous increase in water consumption due to the increase in population, economic and agricultural growth, and as a result an increase in the number of subscriptions.

b) High percentages of water losses: Water losses is the difference between produced water or purchased water quantities and distributed quantities. Rates vary between 25 and 55% of the total water supply. These extremely high losses are mainly a result of rundown water networks, illegal practices by consumers, and metering problems.

4) Political Problems:

a) Political and uncertainty of water availability: Water supply and water management in Palestine are influenced by the Israeli occupation. The Israeli authority controls water

resources, and imposes a fixed water supply quota on the Palestinians. Palestinians also have limited access to their own water resources.

b) **Palestinian–Israeli Joint Committee:** The Palestinian–Israeli joint committee (JWC) is intended to coordinate water management activities between Israel as the full controller of water resources in Palestine. It limits water resources projects which are beneficial to Palestinians such as the drilling of new wells.

5) Legal constraints: Water-related legislation is often inadequate, technically inappropriate and/or economically unaffordable. It is just a theoretical reference and is not applied or implemented. The lack of credible, comprehensive and effective enforcement in Palestine has led to lack of public awareness, and conscious ignoring of these laws.

6) Absence of private sector participation: The water sector in Palestine is considered to be a non-profit sector. This leads to limited financial investment in this sector and as a result increases the dependency on foreign donations, making the water sector subordinate to political changes.

It is also important to summarize the structural institutional performance of the water departments and utilities which were used as case studies, as presented in table 3.8. This table presents the major differences and similarities between these water departments.

Table 3.8 Major Similarities and Differences between Water Departments (Case Studies)

	Tulkarem Municipality	Anabta Municipality	Jericho Municipality	JWU	WSSA
Similarities					
Regulation Framework					
	Weak	Weak	Weak	Weak	Weak
Managerial Framework					
Needs of institutional assessment and evaluation	High	High	High	High	High
Employees Training needs	High	High	High	High	High
Technical framework					
Demand rate	High	High	High	High	High
Average water losses	43% (High)	40% (High)	33% (High)	27 % (High)	40.5% (High)
Financial Framework					
Collection Efficiency	Low	Low	Low	Low	Low
Fund raising needs	High	High	High	High	High
Cost recovery	Low	Low	Low	Low	Low
Debts ratio	High	High	High	High	High
Management Information System					
Sharing national data	Low	Low	Low	Low	Low
Coordination with PWA	Low	Low	Low	Low	Low
Differences					
Technical framework					
Water Availability	High	High	High	low	low
Dependency on Mekorot	Low	Low	Low	High	High

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	Tulkarem Municipality	Anabta Municipality	Jericho Municipality	JWU	WSSA
Managerial Framework					
Availability of organizational structure	Not available	Available (weak)	Available	Available	Available
Availability of job description	Not available	Not available	Available	Available	Available
Independency of water department	Dependent	Dependent	Dependent	Independent	Dependent
Financial Framework					
Water Tariffs	Differentiated	Differentiated	Differentiated	Differentiated	Constant
Personal cost ratio	High	High	High	Low	Moderate
Management information system					
Availability of master plan	Available	Not available	Available	Available	Available
Modern financial programs	Moderate	Moderate	Moderate	High	Weak

The previous table clearly illustrates the poor and decreasing institutional performance and uncertainty within the water sector. It also reflects the urgent need for restructuring the institutional arrangement of the water sector. Moreover this part of the study answered and achieved the specific goal of this research.

The following section investigates stakeholders' attitudes towards water sector performance. Finding will enhance and support these results.

3.3 (Questionnaire)

This part of methodology was developed to test stakeholders' attitudes, opinions and awareness towards the institutional performance of the water sector. It was also a tool to test if there are parallels the case study results and the questionnaire results.

A close-ended questionnaire was distributed to a sample of 100 selected stakeholders. Eighty-one questionnaires were recollected from the sample. There were 62 close-ended questions, and the answers were distributed as follows (Appendix 4).

Totally agree, Agree, Don't know, Disagree, Totally disagree

The main categories of the questionnaire were:

- 1) Evaluation of the Role of the Palestinian National Authority in Institutional Water Management and Water Legislation.
- 2) Evaluation of the Institutional Arrangements and Administrative Structures.
- 3) Evaluation of Water Management Strategies and Policies.
- 4) Evaluation of Administrative, Technical and Financial Performance of Water Institutions.
- 5) Investigation of the Future Institutional Arrangements for the Management of the Water Sector

3.4 Sample Frequencies and Description

The sample was distributed to four main stakeholder categories::

- 1) Academic 2) Municipalities 3) Governmental 4) NGOs (related to water sector)**

Table 3.9 Sample Frequencies

Type of Organization	Description	No.	Percentage
Academic Institutions	Birzeit University, Al-Quds University, Bethlehem University, Al-Najah University	15	18
Governmental Institutions	West Bank Water Department, Ministry of Agriculture, Palestinian Water Authority, Local Councils, Negotiation Affairs, Ministry of Local Governorate, Local Councils, Environmental Authority, Peccdar	25	31
Non-Governmental Organizations	Palestinian Hydrology Group, UNESCO, Anera, GTZ,WSSA, Red Cross, Palestinian Agricultural Relief, Jerusalem Water Undertaking, House of Water, Abu Dies Water Association	28	35
Municipalities	Anabta Municipality, Tulkarem Municipality, Jericho Municipality ,Bit Ommar Municipality, Dura Municipality, Halhol Municipality, Hebron Municipality.	13	16
Total		81	100%

3.5 Statistical test for the questionnaire:

It was important to test the sample in terms of its distribution, which was supposed to be a normal distribution. In order to do this the Kolmogorov-Smirnov Z test was done. This is usually applied to nonparametric data.

It was found that the value range, which should be 5 in perfect cases lay between 2-3.7. This means that the sample was very close to the normal distribution.

3.6 Justification of the sample:

The sample was distributed to various institutions which have a direct relationship with the water sector. Each one of these institutions has a certain role, starting from the water regulator and ending with water provider. They were chosen for the following reasons:

1) Academic Institutions (Universities): These universities were established many years ago and have experience in this field. Their work can be divided into many tasks such as (teaching, water researches, advising the Palestinian Water Authority, consultation with local municipalities and fund raising).

This group has their independent point of view, which is neutral and have a good and long experience in water sector and all its institutions. They also have available, diverse and accurate data about water sector's problems, deficiencies and they have a clear vision.

2) Municipalities: Municipalities are the main water provider for different areas in the West Bank. There are about 50 municipalities distributed in the West Bank. Many of these municipalities have an independent water department and others have a dependent departments.

This group has a long experience in providing water. They started to manage water services through simple techniques and resources, evolving to their present state as large municipalities with extended coverage areas. They also have good mutual relations with funding agencies. This group considers itself as being independent entities which started

alone and are supposed to remain alone, which means that they have no obligation to report to the PWA or other governmental representatives.

3) Non-Governmental Organizations: This group was chosen for specific reasons. The main reason was that these organizations are part of water institutions in the West Bank. They have databases covering all aspects of the water sector. Most of their activities are concentrate on improving institutional water sector performance. These activities include: drilling new wells, improving water networks, raising public awareness regarding the water crisis, training and developing water sector staff, participating in local and international water conferences, assisting the PWA, assisting and in most cases providing funds to municipalities and local councils.

This group is supposed to have a logical and subjective vision of the water sector's needs, challenges, available resources and future demand.

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4) Governmental Organizations: This group is the important since it has several important tasks including:

Water regulations, fund raising, coordinating with the Israeli firm "Mekorot", coordinating with the Palestinian-Israel joint committee, negotiating and signing contracts, approving water projects, applying water surveys, supervising and controlling water institutions.

This group should have an ideal, subjective, and accurate data and vision about managing water institutions. Their opinion is supposed to be valuable to this research since they are in the upper hierarchy of water institutions which have accurate and diverse data.

Some examples of these institutions are West Bank Water Department, Palestinian Water Authority, Ministry of Local Governorate and Ministry of Agriculture.

3.7 Testing Hypotheses:

The hypotheses were tested using the SPSS statistical package. Each hypothesis was tested according to a different method such as correlation coefficient, T-test, comparing means, F-test, and ANOVA. α was (.05).

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Hypothesis No.1:

Current institutional and structural frameworks and settings in the West Bank are efficient and cope with water sector needs, problems, conflicts and challenges.

In order to test this hypothesis, 12 questions were posed (Appendix No.4), taking many variables and issues into consideration.

It was found the highest mean values were 4.17 and 4.25 for Q7 and Q.8. Respectively, these questions related to the lack of homogeneity and disparity within the institutional structure of the water sector and the need to reform this structure in order to manage water resources in an ideal way.

The lowest mean value was 2.58 for Q12 which was asked about the existence of communication channels between water institutions, starting from PWA and ending with small community councils. The T-test was also carried out to verify the effect of each question on the current structural performance of water institutions. All T-values were significant .

In order to evaluate the current institutional and structural framework from the sample point of view, each question was taken into consideration. The results of mean values were as follows:

- 1) More than 52% of the sample agreed that the current institutional structure separates the higher authority that draws up the policies and management plans between departments and municipalities working under their control.

- 2) From the sample point of view, water institutions operating in the water sector enjoy an administrative and financial autonomy and don't need to await action from PWA.
- 3) The majority of the sample did not agree that the Palestinian Authority - and as a result the PWA – determine water policies so that water units and municipalities under their control only have to implement the decisions and policies.

Based on the sample point of view, hypothesis No.1 is rejected and the current institutional and structural frameworks and settings in the West Bank are inefficient and do not cope with water sector's needs, problems, conflicts and challenges.

Hypothesis No.2:

There are clear and effective institutional strategies and policies for managing the water sector.

To test this hypothesis, 12 questions (Appendix No.4) were asked to evaluate applied water strategies and policies.

The highest mean value was 3.95 for Q21, which was asked whether existing water policies suffer from a weak finance and administrative level which is inconsistent with the current situation of the water sector. The second highest mean value was 3.83 for Q17, which asked whether there was a lack of feedback between the PWA and water utilities and municipalities.

The lowest value of mean was 2.53 for Q26. It asked whether the PWA's applied control system followed the performance of water institutions in terms of applying water resource strategies and policies. The result indicates that the majority of the sample did not agree with this statement.

The T-test was performed for all the questions that evaluated the effectiveness of water strategies and policies. All t-values were significant.

It is important to mention the sample's point of view for all questions related to water strategies and policies. The results were as follows:

- 1) The majority of the sample did not agree that there is a clear strategy for the management of water resources in institutions working in the water sector (strategy formulation, implementation with an updated evaluation)
- 2) The majority of the sample did not agree that the PWA involves other related sectors such as agriculture and industry in the formulation and implementation of water strategies and policies.

78% of respondents believe that the planning of water strategies and policies is monopolized by governmental institutions. This is also consistent with the results of Q27

which had a mean value of about 2.79. It looked at whether the PWA involved all stakeholders in formulating water resources strategies and policies.

This means that the majority did not agree that the PWA involves all stakeholders in formulating water strategies and policies. This goes against the ideal institutional performance recommended by Nickson (2000) that water management should be based on a participatory approach involving users, planners and policy-makers at all levels.

Based on the above results, hypothesis No.2 is rejected. This means that the current institutional strategies and policies for managing water sector are not clear or efficient.

Hypothesis No.3:

The water sector's current technical institutional performance is inefficient, fragmented and dispersed .

To test this hypothesis 20 questions were analyzed (Appendix No.4, Q29--49) to evaluate the technical institutional performance.

The highest mean value was 4.36 for Q36 which asked whether the lack of executive authority in the application of civil law was the main reason for low collection efficiency and accumulated debts. The T-test that was carried out was significant for this question. This indicates that the lack of executive authority is the main cause of accumulated debts.

The second high mean values were 4.19, 4.17, 4.02 for Q29, Q35, Q30. These questions related to the municipalities and administrative units in the water sector, which are suffering from the difference of prices charged to consumers. They are also suffering from a high proportion of water losses, due to the weakness of funding for repairing the networks. This in addition to the inefficient administration and over employment, which led to an acute decline in the level of services provided to consumers.

The lowest mean value was 2.65 for Q42, It looked at organizational structure and the availability of job descriptions and specifications for employees. The low mean indicates that

the majority of the sample did not agree that water institutions have job descriptions and specifications.

The second lowest mean value was 2.86 for Q45. Q45 asked whether water institutions have an available economic equation for approving the price for each cubic meter of water. A high percentage of the sample did not agree that water institutions have an economic criteria for approving the water tariff.

Q43 was also analyzed. It looked at whether the ratio between the number of working staff in governmental departments, municipalities and the proportion of the population that receives the service is reasonable and proportionate to the volume of service. The mean value for this question was 2.78, which means a high percentage of the sample did not agree with this statement.

The T-test was applied to these questions, and all of them were significant.

Based on the above results and following the sample's point of view, hypothesis No.3 is accepted and the current technical institutional performance for water sector is inefficient, fragmented and dispersed.

Hypothesis No.4:

There is a positive and statistical relationship between the availability of legal texts for managing water resources and the applied strategies and policies by water institutions.

This hypothesis was tested using the ANOVA test.. It was important identify the relationship between Q13, which related to the availability of legal texts that facilitate and control water policies, and Q20, Q22, Q25 and Q28 (Appendix No.4). These questions were related to the applied policies and strategies.

It was found that the F-value was only significant for Q20. This related to current water policies in water sector institutions which included modern management concepts like integrated management, quality, quantity control and ideal administration.

F-values for the other questions were not significant. This means that there is no relationship between the availability of legal texts and how they are implemented. Meanwhile mean values for questions 20, 22, 25 were low. Question 28 (water distribution to consumers should be a priority for the management in the water sector) presented a mean value of 3.46., This result was true and consistent with the current water law, which considers water as a public and basic need that should be available to all the people.

According to the above results, there is no relationship between the availability of legal texts and the included strategies and polices on the one hand and water institutions' failure to apply these polices.. The deficiency may be a result of other factors such as the absence of legal and executive authority to force water institutions to implement them. As a result hypothesis No.4 is rejected.

Hypothesis No.5:

There is a positive and statistical relationship between the need to renew the current legislation of water resources strategies and polices, and the current disparity, inefficiency and weak performance of water institutions.

This hypothesis was tested in order verify the consistency of the sample, i.e. verifying whether there is a consistency between **their** respondents' desire to renew water regulations and their answers to the questions that deal directly with the deficiency of water institutions.

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In order to test this hypothesis, the correlation coefficient between Q5 and Q29, Q33, Q35, Q36, Q38 (Appendix No.4) was examined.

It was found that the correlation coefficient was only significant for Q29, which concerned the different water tariffs among water municipalities and water units.

The other questions were not significant to Q5. These results indicate that the stakeholders agreed that there is a need to renew water regulations and polices. Furthermore they agree that the current performance of water institutions is inefficient, dispersed, and financially corrupt.

Although these two statements should have a positive relationship, it was found that there is no relationship between them.

Based on the above findings, hypothesis No.5 is rejected and there is no relationship between the need to reform water regulations and the current deficiency of institutional performance in water institutions.

Hypothesis No.6:

There is a positive relationship between stakeholders' opinion towards reforming the institutional structure and the current deficiency of water institutions.

In order to test this hypothesis, it was important to find a correlation coefficient between Q62 and all the related questions concerning the weak performance of water institutions (Q7, Q8, Q29, Q30, Q31, Q32, Q33, Q34).

Closer study showed that there is a negative correlation coefficient between Q62 and the other questions. This indicates that the stakeholders highly encourage the reform and restructuring of the current institutional framework as a result of the corruption and weak performance of water institutions.

Based on the above information, hypothesis No.6 is accepted. One can conclude that there is an urgent need to re-evaluate and restructure the institutional performance of the water sector.

Hypothesis No.7:

Non-governmental organizations strongly encourage water sector restructuring and reform.

This hypothesis was tested using the NPar Test. This test showed that the **descending** rank of organizations was as follows:

<u>Organization</u>	<u>Mean Rank</u>
1. NGOs	45.65
2. Governmental Organizations	41.02
3. Academic Organizations	38.15
4. Municipalities	34.77

These results show that NGOs are the first to strongly encourage the restructuring of the water sector's institutional structure. The second are governmental organizations. As a result, Hypothesis No.7 is accepted.

This result makes sense since these organizations have factual and accurate data about water institutions' problems, needs and deficiencies. However, municipalities are thought to fight the restructuring because the new arrangements will have a negative impact on them: in the new structure their work, resources and performance will be evaluated and controlled

The previous analyses reflect a consistency between the poor performance of the water sector identified in the case studies, and the stakeholders' attitudes towards the institutional performance of water sector. This result is considered as to be positive, as it forms a major objective of this study.

However, these results fully reflect that the public sector is not capable of efficient institutional management. The deficiencies and problems mentioned in the assessment of the investigated water institutions underscore this.

As a result, other alternatives should be recommended in order to develop the institutional performance of water institutions. These alternatives should be based on economical, financial, technical principles as well as on the participatory approach system.

Based on these results, the optimum institutional model for managing the water sector is a partnership between the public and the private sector. This partnership is known as the Public-Private Partnership [PPP]. All the advantages and disadvantages of this model should be taken into consideration (figure 3.8).

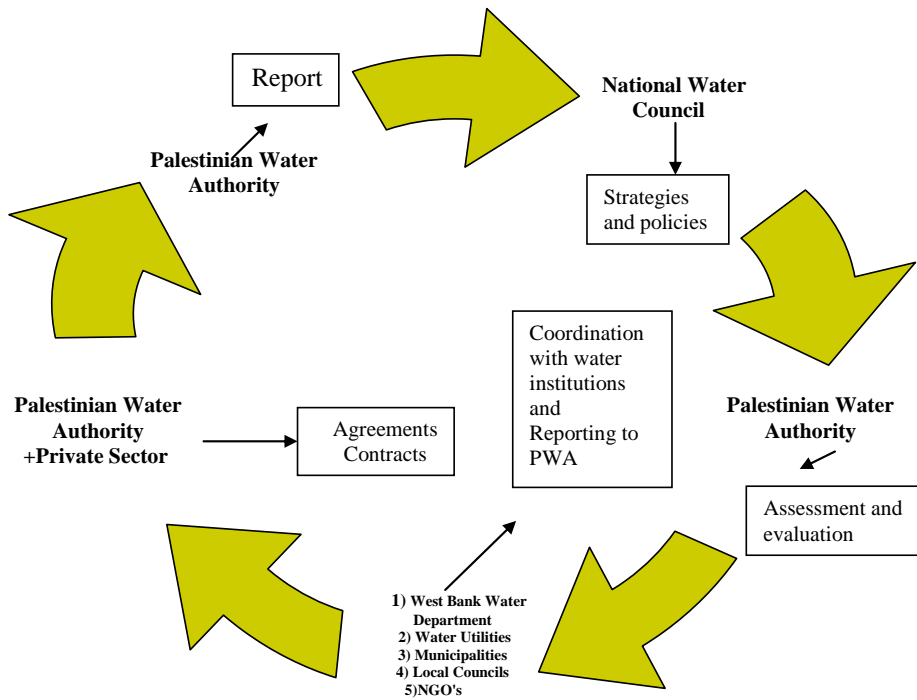


Figure: 3.8 The recommended institutional model for managing the water sector in the West Bank

This model should be applied according to the following integrated system of tasks (Each group has to take its responsibilities).

The first level: NWC responsibilities:

The National Water Council must take on a strong, efficient, responsible, real and corrective action role. It should first of all formulate applicable water strategies and policies to guarantee an economic, financial and managerial basis for the water institutions. The NWC should then ensure that these strategies and policies are applied by the water utilities and municipalities, using the PWA as a regulator and supervisor of water sector. Meanwhile, the NWC should demand an urgent re-evaluation and renewal of water regulations and texts. The process could be initiated at a municipal level where the PWA could perform an evaluation to define the needs and determine the level of private sector participation. Additional important steps include the auditing of financial reports, the repairing of networks, and staff training.

The second level: PWA responsibilities:

Besides coordinating relations with the Israelis and **presenting** water sector, the PWA must reinforce its role towards water-related institutions by performing the following tasks:

Use of word not clear do you mean representing **[36f]Comment**

1) The PWA must be the regulator and overall supervisor of the water sector. It should therefore first re-evaluate the water tariffs and financial reports provided by water utilities and municipalities. To do this it might be useful to establish a new especially dedicated department within PWA, while at the same time attracting new expertise to execute these tasks.

2) The PWA should establish a base for the execution of NWC-approved water policies and strategies. It should establish a data bank for all water-related institutions in order to have available data upon demand. In addition communication channels between water-related institutions should be multiplied and strengthened.

3) The PWA should develop criteria for cost recovery, which are to be applied by water institutions. The private sector could play a major role here, by participating in the financial auditing of reports and recommending strategies for ensuring cost recovery.

4) Low collection efficiency was one of the main problems faced by water institutions. The PWA must find an economic solution for dealing with non-paying customers.

5) Fund raising criteria is an important component for developing water institutions. The PWA should enhance this component through Public-Private Partnership (PPP) agreements. It could give the private sector a portion from the collected bills as a compensation for their efforts.

**The third level:
Water utilities, municipalities, local councils, and NGOs responsibilities:**

These water institutions should take their responsibility by implementing the following tasks:

1) Coordinating and reporting to the PWA: they should constantly provide the PWA with financial and technical reports.

2) Strengthen communication channels with other municipalities and local councils, especially those who share the same water basin. The PWA could encourage the heads of municipalities and water utilities to meet and share experiences and seek solutions to their problems.

3) Inform the PWA of their needs and of the institutional problems they face. The PWA will in turn assess them through PPP contracts, especially for those municipalities which have available water resources.

4) NGOs should coordinate their work with the PWA, the WBWD and other NGOs in order to avoid duplication of work and overlapping projects.

Chapter -4-

Conclusion and Recommendation

4.1 Conclusion

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Case studies and statistical analysis have shown that the institutional water sector in the West Bank has many shortcomings and weaknesses. The most important finding was the consistency between the findings in the case studies and the questionnaire results. This indicates that there is a truly weak performance of the water sector in the West Bank. This sector neither accomplished the instrumental principle of giving water an economic value, nor did it accomplish the institutional principle, according to which water management should be based on a participatory approach and involvement of users, planners and policy makers at all levels.

Moreover, the institutional performance of the water sector is an integrated and unitary system, which means that all components are interdependent. This became clear through the applied case studies which revealed the overall weak performance of the sector.

However, this research shows that the institutional performance of the water sector is no more than a service provider, in which planning, organizing, controlling and managing roles are weak. In addition, water departments are often dependent of municipalities and the bad financial and administrative influences which were found in the case studies. In most cases, water departments disposed over the necessary water resources, but had neither the financial nor administrative framework to work in a sustainable or efficient manner.

National planning and integrated roles, strategies and policies are not found, in which water regulations and legal practices to control water sector are not available where it was just a theoretical framework without any real applications. This is because the National Water Council strategies and policies were not applied by different stakeholders. As a consequence there was a lack of coordination and a deficient follow-up system among water institutions.

Analysis of this research shows that the current institutional and structural frameworks in the West Bank are inefficient and don't cope with the water sector's needs, problems, conflicts

and challenges. Moreover, the current technical institutional performance of the water sector is inefficient, fragmented and dispersed.

According to the questionnaire analysis, NGOs working in the water sector are the first to strongly encourage the reform of the water sector's institutional structure. The second are governmental organizations. This means that stakeholders strongly emphasize the need to re-evaluate and restructure water institutions in the West Bank

4.2 Recommendations

Based on the findings of this study, the first and most important recommendation is that water demand should be controlled and that the efficiency of water resources allocation should be enhanced based on economic and a water resources management framework. However, in order to achieve successful water resources management, this is not only the task of water stakeholders. Society as a whole has a collective responsibility to develop, protect, and manage water resources in order to assure sustainability.

Since the institutional performance of the water sector should be coordinated by different stakeholders, **it** should be identified, divided and shared as a whole package. This can be accomplished by the National Water Council and the PWA, if they strengthen their role and assume their responsibilities.

What is "it" referring to? **[37]**Comment

Such a process could be initiated from within the higher-level legal and regulative frameworks. It should be rearranged according to the previous results of this study. Water regulations should be documented and distributed to all stakeholders. They should not be just theoretical, but should be practically applicable, since it was found that these regulation lack of policies and strategies that insure and enhance water resources management. (The different tariff system and its influences is an important example).

The PWA should strengthen its role as a regulator and overall supervisor in all aspects, especially for developing strategies and policies, in addition to organizing and controlling water institutions activities.

In terms of the technical performance of water institutions and the key results, shortcomings and weaknesses of the water sector, such as high water losses, low collection efficiency, high accumulated debts, high personnel cost ratio, further research is needed.

Public awareness among the different stakeholders in water-related institutions should be enhanced, especially regarding the importance of shared national data and the coordination among stakeholders. Moreover, academic and media organizations should assume the responsibility of raising awareness of water resources and its importance to other sectors. The

organization of special stakeholder workshops and training courses could contribute to this improved awareness.

Furthermore, structural, administrative, personnel and financial performance should be assessed according to modern and new managerial criteria, which ensures sustainable and optimum use of water resources. Increasing the independency of water departments could help achieve this goal.

The executive authority should take responsibility over water institutions, especially with respect to non-paying customers and their influence on water availability. The authority should enforce payment.

The culture of national and integrated planning and development of water institutions should be encouraged and start to work before the water crisis reaches a high level.

Since water institutions rely on water resources, qualified employees, available assets and financial resources, they should make sure that these resources are combined efficiently. Employees' qualification and skills should be continuously developed. In addition, important functions such as public relations, planning and development and management information should be introduced in water institutions.

NGOs have a long experience in working with the water sector and dealing with its problems, challenges and development limitations. They should be aware of their fragile position, especially with regards to their dependency on foreign funds. Local water organizations should strive to rely on and develop their own resources so as to be prepared for the eventuality of foreign funds being suddenly interrupted. NGOs should work with governmental organizations to seek solutions for communities which still have poor water systems and are not connected to networks. These communities should be prioritized in water projects.

New software programs should be distributed and among water institutions in order to improve their technical and financial reporting and data collection.

As a result of all this discussion, it is clear that the public sector will be unable to cope with the increasing demand for water. Moreover the lack of managerial and technical skills and capacities and the limited financial resources and investments restrict the public sector's ability to improve water-related institutions. The **Public-Private Partnership** model, in which both sectors work together within a properly defined framework, could be applied in the West Bank. This would allow them to fulfill their roles in a cooperative and responsible way.

The contracts should be short-term agreements because they are a new arrangement whereby specific operations and maintenance activities are contracted to the private sector especially for municipalities and local councils which have available water resources. Payment to the private sector is usually made on the basis of fees agreed in advance, lump sums or unit costs. Under this type of contract, the public sector retains overall responsibility for the administration of the service and the private sector undertakes specific activities with a low degree of risk. Service contracts are often used for first-time private sector participation,

These contracts could to accomplish the following positive results:

- a) Attract qualified people who will enhance management skills and technical know-how to improve the service.
- b) PPP will facilitate the mobilization of financial resources and minimize problems such as accumulated debts and low collection efficiencies.
- c) PPP will enhance water quality services. This could be accomplished through rehabilitating and improving water networks.
- d) PPP will create self-supporting municipalities and water utilities by enhancing and improving their managerial, financial and technical performance.
- e) PPP will improve cost recovery and financial efficiency. It will also increase financial resources for potential expansion and improvement. In addition it will guarantee a quick response when system maintenance and repair is required.

f) PPP should be based on written agreements in order to make sure that water resources are not be transferred to the private sector and water tariffs are not higher than what the public can afford.

The above mentioned model is considered to be the first model for strengthening the institutional performance of water-related institutions in the West Bank. If applied correctly and conscientiously, this model can guarantee efficient and sustainable institutional management of water resources. It will also minimize problems and deficiencies in the institutional performance of the water sector.

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 - 4) Personal interview with Anabta Municipality representatives.
 - 5) Personal Interview with Jericho Municipality representatives.
 - 6) Personal Interview with JWU representatives.
 - 7) Personal Interview with WSSA representatives.

Appendix 1



Types of Institutional arrangement in the Middle East

Type of institution	Advantages	Disadvantages	Examples
<p>Separate Ministry for water resources, responsible for water resource management and planning.</p>	<p>1) Development of specialization and concentration of expertise on water-related matters within a single institution.</p> <p>2) A separate ministry serves in itself to reflect the State's or Government's concern for water Issues.</p> <p>3) Equal status in dealings</p>	<p>1) Water-related issues may be sidelined instead of being integrated into economic Development.</p> <p>3) The fact that the ministry is separate from other ministries may impede coordination, oversight, enforcement and policy implementation generally.</p> <p>3) Water issues will probably be</p>	<p>Oman and Saudi Arabia,</p>

	with other sectoral ministries.	neglected in other ministries because they are the concern of a separate ministry	
Water-related matters, including water resource planning and management and water utilization, handled by one of a number of departments within a single ministry (irrigation/agriculture/energy)	- Water issues can readily be taken into account in the development of policies relating to irrigation, agriculture, electricity/energy, and the like.	<p>1) May lead to limited scope for water-related activities (since they are not comprehensive activities as in the case of a separate ministry).</p> <p>2) The interests of water resource planning and management may conflict with those of water utilization handled by other departments. Planning and management may be neglected in favor of utilization projects. (irrigation, agriculture, and so on);</p> <p>3) May reflect a low level of concern with water-related issues</p>	<p>1) Water Resources and Irrigation (Egypt),</p> <p>2) Irrigation (Syrian Arab Republic),</p> <p>3) Labor and Agriculture (Bahrain),</p> <p>4) Water and Irrigation (Jordan),</p> <p>5) Electricity and Water (Lebanon).</p>
Ministry of Electricity and Water responsible for drinking water (with specialized bodies for desalination, urban water supply and rural water supply)	This type of institutional arrangement is common in States that rely mainly on desalination	Poor coordination with water resource planning authorities, and inadequate concern with water resource management (tendency to concentrate on utilization and extending water	Yeman

		and sanitation services)	
Water authority or inter ministerial committee responsible for integrated water policy development	<p>1) Same advantages as in the case of a separate ministry (concentration of expertise within a single institution, indication of Government's concern), but does not have equal status in dealings with other ministries. may be of lesser status than a ministry.</p> <p>2) Representation of all relevant bodies facilitates policy coordination.</p> <p>3) Representation of all relevant bodies means that all aspects can be discussed before policy is settled</p>	<p>1) Same disadvantages as in the case of a separate ministry (problems arising from the fact that water issues are isolated from economic development, coordination difficulties, neglect of other water related bodies, difficulties in policy application and water resource management.</p> <p>2) No representation in Council of Ministers, little influence.</p> <p>3) Low-level representatives on the authority or committee.</p> <p>4) Other practical difficulties (e.g. infrequent meetings) that complicate timely decision making</p>	<p>1) National Water Resources Authority in Yemen,</p> <p>2) The Palestinian Water Authority in Palestine,</p> <p>3) The High Council for Water Resources in Bahrain,</p> <p>4) The High Committee of Water Planning in Egypt.</p>
Advisory councils that are established expressly to prepare integrated water resource development and water planning policies	<p>1) Participation by volunteer organizations, the private sector and national organizations</p>	<p>1) The council is advisory in nature, and consequently its recommendations may not be taken into account in policy</p>	<p>1) The Friends of Environment Society in Jordan .</p> <p>2) The</p>

	<p>is facilitated by the fact that the institution is advisory in nature.</p> <p>2) Assorted viewpoints can be taken into account in policy preparation.</p> <p>3) Creates channels of communication with the popular sector</p>	<p>development.</p> <p>2) Council has no powers/ jurisdiction and consequently may find its role reduced to little more than raising public awareness about water issues</p>	<p>Association of Environmental Friends in Yemen.</p>
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Source ESCWA Puplicaton,2001

Appendix 2

Structural Institutional Performance Criteria

1) Regulation Framework When, Where, How	
Applying Water Laws	
Controlling Water Quality, Quantity , Water Tariffs , which is mentioned in Water Law	What is the Procedure
2) Technical Framework	
<i>Supply side</i>	
Coverage Area	
Coverage tool: (Network, Constant source, Tanks,.....)	
Water Supply	
Number of served Population	
Service coverage	
Water availability	
Network Length	
Water losses	
Distribution Criteria (Shares, Priorities ,)	
Production Cost	
Collection efficiency	
Number of Customer Complains	Qualitative or Quantitative
Demand Rates	
3) Management Frame work	
Availability of Organizational Structure	
Availability of Job Descriptions	
Number of Employees	
Job specifications	
Educational Level	
Employee qualifications	
Total Salaries	
Type of Contracts	Temporary or Permanents ????
Type of Training Internal or External	
Financing of Training	
4) Financial Framework	
Debts Ratio	
Accumulated Debts	
Debts Sources (Customers, water losses, Government,.....)	
Pricing of water and water services	
Personal cost Ratio	
Fund Raising	
Cost Recovery	
Fund Raising Criteria	
5) Management Information System	
Management Information	
Sharing national data	
Coordination with other water departments and municipalities .	Criteria
Data Bank	
Type of Data	
Data entry	Manual or Computerized
Availability of Master Plan	
Availability of annual Reports	(Budget, Income statements,.....)
6) Conflict Resolution	
Conflict Management	Criteria and applying Laws

Appendix 3



نموذج تقييم أداء المؤسسات والبلديات

• اسم المؤسسة : _____

• الموقع : _____

• عدد الموظفين : _____

• (طبيعة الوظائف) :

_____ إدارية

_____ فنية

• التبعية الإدارية:

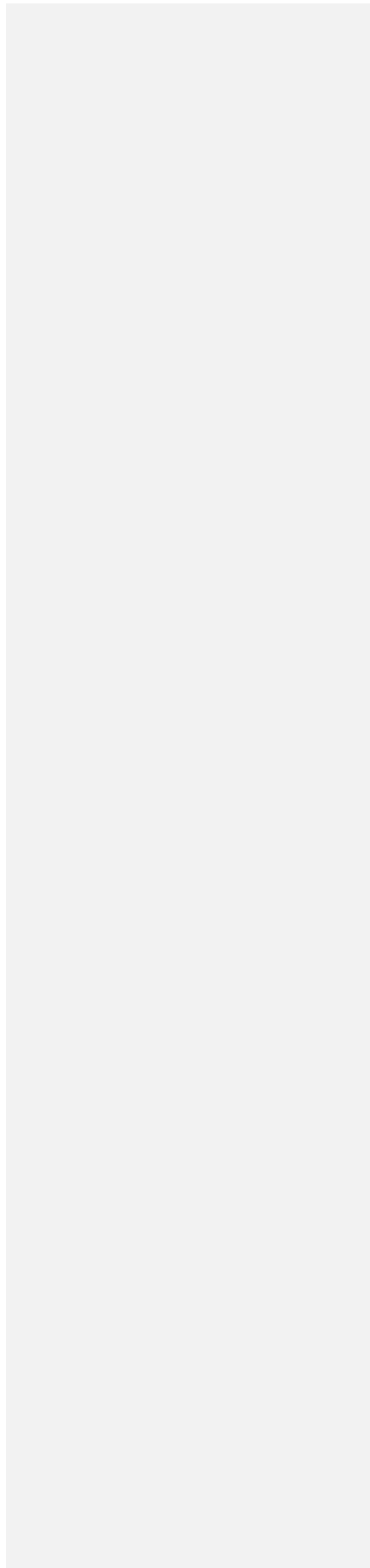
• طبيعة عمل المؤسسة:

(1) أكاديمية (2) تشريعية (3) حكومية (4) أهلية (5) غير ذلك

الجوانب القانونية	ملاحظات (من ، متى ، وكيف)
مدى قيام البلدية أو المؤسسة بتطبيق القوانين والتشريعات المائية	
الإشراف على جودة المياه التي تصل إلى المستهلكين والمنصوص عليها في التشريعات	
الإجراءات الرقابية المستخدمة على الأسعار وجودة المياه	
الجوانب الفنية	
عدد السكان الذين تصلهم الخدمة	
نسبة الذين تصلهم الخدمة إلى نسبة السكان (حجم التغطية)	
نسبة الفاقد	
آلية توزيع الخدمة (حصص ، أولوية،.....)	
تكلفة إنتاج الخدمة	
كفاءة التحصيل (نسبة التحصيل السنوية)	
وفرة المياه (أيام الأسبوع)	
الجوانب المتعلقة بالموظفين	

	<ul style="list-style-type: none"> • عدد الموظفين • أنواع الوظائف • تحصيلهم العلمي • مجموع الرواتب • نوع التعاقد مع الموظفين (دائمين ، غير متفرغين)
	آلية تطوير الموظفين وتدريبهم
	مراقبة الأداء (الآلية، والفترة الزمنية)
	الجوانب المالية
	حجم الديون المتراكمة (السنوية)
	آلية التسعير (ثابتة، متغيرة)
	نسبة رواتب الموظفين إلى التكاليف الأخرى باستثناء تكاليف الإهلاك و أسعار الفائدة
	القدرة على تغطية التكاليف
	آلية استقطاب الدعم المالي المحلي أو الخارجي
	إدارة المعلومات
	آلية إدخال البيانات
	الاطلاع على تجارب البلديات الأخرى ومشاركة البيانات معهم
	آلية التنسيق بين الإدارة العليا والبلديات التابعة لها
	توثيق المعلومات
	توفر التقارير السنوية
	توفر البيانات المتعلقة بالمستهلكين
	توفر البيانات المالية
	الإشكاليات الإدارية
	آلية إدارة الأزمات
	تطبيق الأنظمة والقوانين المنصوص عليها في النظام

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Appendix 4

نموذج تقييم أداء المؤسسات والبلديات

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فنية _____

□ التبعية الإدارية: _____

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□ طبيعة عمل المؤسسة:

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(1) أكاديمية (2) تشريعية (3) حكومية (4) أهلية (5) غير ذلك

ملاحظات (من، متى، وكيف)	الجوانب القانونية
	مدى قيام البلدية أو المؤسسة بتطبيق القوانين والتشريعات المائية
	الإشراف على جودة المياه التي تصل إلى المستهلكين والمنصوح من عليها في التشريعات
	الإجراءات الرقابية المستخدمة على الأسعار وجودة المياه
	الجوانب الفنية
	عدد السكان الذين تصلهم الخدمة
	نسبة الذين تصلهم الخدمة إلى نسبة السكان (حجم التغطية)
	نسبة الفاقد
	آلية توزيع الخدمة (حصص، أولوية،.....)
	تكلفة إنتاج الخدمة

	كفاءة التصميل (نسبة التصميل السنوية)
	وفرة المياه (أيام الأسبوع)
	الجوانب المتعلقة بالموظفين
	<input type="checkbox"/> عدد الموظفين <input type="checkbox"/> أنواع الوظائف <input type="checkbox"/> تمصيلهم العلمي <input type="checkbox"/> مجموع الرواتب <input type="checkbox"/> نوع التعاقد مع الموظفين (دائمين ، غير متفرغين)
	آلية تطوير الموظفين وتدريبهم
	مراقبة الأداء (الآلية، والفترة الزمنية)
	الجوانب المالية
	حجم الدين المتراكمة (السنوية)
	آلية التسعير (ثابتة، متغيرة)
	نسبة رواتب الموظفين إلى التكاليف الأخرى باستثناء تكاليف الإهلاك وأسعار الفائدة
	القدرة على تغطية التكاليف
	آلية استقطاب الدعم المالي المحلي أو الخارجي
	إدارة المعلومات
	آلية إدخال البيانات
	الإطلاع على تجارب البلديات الأخرى ومشاركة البيانات معهم

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	آلية التنسيق بين الإدارة العليا والبلديات التابعة لها
	توثيق المعلومات
	توفر التقارير السنوية
	توفر البيانات المتعلقة بالمستهلكين
	توفر البيانات المالية
	الإشكاليات الإدارية
	آلية إدارة الأزمات
	تطبيق الأنظمة والقوانين المنصوص عليها في النظام

استبيان

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طبيعة عمل المؤسسة التي تعمل بها :

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القسم الثاني : يهدف هذا القسم من الاستبانة إلى التعرف على منطلقات و نهج وآليات إدارة قطاع المياه في فلسطين من النواحي (القانونية ، الإدارية ، الاستراتيجية ، الفنية ، و الهيكلية)

تقييم دور السلطة الوطنية الفلسطينية في إدارة الموارد المائية ووضع التشريعات المائية

الأول :

أوافق بشدة	أوافق	لا أعرف	أعارض بشدة	أعارض
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					<u>تعاني المؤسسات العاملة في قطاع المياه من عدم تجانس في عملها بالإضافة إلى الازدواجية و تداخل التخصصات والتي تخلق مشكلات ومعوقات تؤثر على الأداء الإداري</u>	Formatted: Font: 11 pt, Complex Script Font: 11 pt
					<u>يرتبط الأداء الإداري، الفني، والتقني في المؤسسات الغير حكومية بنوع التمويل وحجمه</u>	Formatted: Font: 11 pt, Complex Script Font: 11 pt
					<u>تعاني المؤسسات غير الحكومية العاملة في قطاع المياه من تدخل الدول المانحة في هيكلها الإدارية مما يسبب عائقاً أمام تغيير وتطوير هذه الهياكل</u>	Formatted: Font: 11 pt, Complex Script Font: 11 pt
					<u>إن تمويل المؤسسات غير الحكومية العاملة في قطاع هو سبب رئيسي في ديمومتها</u>	Formatted: Font: 11 pt, Complex Script Font: 11 pt
التالي - تقييم الإستراتيجيات والسياسات الإدارية المائية						Formatted: Justify Low
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					<u>أعترض</u>	
					<u>لا أعرف</u>	
					<u>أوافق</u>	
					<u>أوافق بشدة</u>	
					<u>تعاني مؤسسات قطاع المياه من عدم وجود تغذية راجعة ()</u>	17
					<u>Feed Back بين الوحدات والبلديات، والمؤسسات ذات الاختصاص المسؤولة عنها في قمة الهرم الإداري</u>	Formatted: Font: 11 pt, Complex Script Font: 11 pt
					<u>هناك إستراتيجية إدارية واضحة ومعتمدة لإدارة موارد المياه مقررة لدى المؤسسات الحكومية في قطاع المياه (صياغة الإستراتيجيات، تنفيذها، تقييمها أولاً بأول)</u>	81
					<u>تركز المؤسسات الحكومية في قطاع المياه عند رسم الخطط والسياسات الإدارية على التنسيق بين قطاع المياه و القطاعات الأخرى كالزراعة والصناعة بمنظور شامل ومتكامل</u>	91
					<u>تتضمن السياسات المائية المتبعة حالياً في مؤسسات قطاع المياه مفاهيم الإدارة الحديثة (الإدارة المتكاملة، الجودة والنوعية، الإدارة الرشيدة للمصادر ، التنسيق الرأسي و الأفقي بين المؤسسات والوحدات والبلديات)</u>	20
					<u>تعاني الإستراتيجيات والسياسات المائية المقررة حالياً من قبل الحكومة والمنفذة من قبل المؤسسات والبلديات من مستوى إداري ومالي ضعيف لا يتلاءم مع الوضع الحالي لقطاع المياه</u>	21
					<u>الجملة</u>	Formatted: Right
					<u>أعترض بشدة</u>	
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					<u>أوافق بشدة</u>	
					<u>الإستراتيجيات والسياسات المائية المنفذة حالياً تقوم على مبدأ إدارة الطلب والتوزيع العادل للمصادر</u>	22
					<u>يتم الإستراتيجيات و السياسات المائية هو احتكار للمؤسسات الحكومية ذات الاختصاص</u>	23
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					تقوم سلطة المياه بتعميم هذه الاستراتيجيات والسياسات على الجهات المعنية لفهمها والإطلاع عليها وتنفيذها	24	Formatted: Font: 11 pt, Complex Script Font: 11 pt
					تقوم المؤسسات التنفيذية بتطبيق السياسات المائية المقررة من قبل سلطة المياه	25	Formatted: Right Formatted: Font: 11 pt, Complex Script Font: 11 pt
					تقوم سلطة المياه بحاسبة المؤسسات التي لا تقوم بتنفيذ الاستراتيجيات والسياسات المائية	26	Formatted: Right Formatted: Font: 11 pt, Complex Script Font: 11 pt
					تقوم سلطة المياه بإشراك جميع الأشخاص ذوي العلاقة عند القيام برسم الاستراتيجيات والسياسات المتعلقة بإدارة مصادر المياه	27	Formatted: Right Formatted: Font: 11 pt, Complex Script Font: 11 pt
					إهرة مصادر المياه بصورة عادلة وتوزيعها على المستهلكين هي من أولويات السياسات المتبعة في إدارة قطاع المياه	28	Formatted: Right Formatted: Font: 11 pt, Complex Script Font: 11 pt
الرابع : تقييم الأداء الإداري، الفني ، المالي لمؤسسات قطاع المياه							Formatted: Right Formatted: Font: 11 pt, Complex Script Font: 11 pt
	أعراض بشدة	أعراض	لا أعرف	أوافق	أوافق بشدة	الحملة	Formatted: Right Formatted: Font: 11 pt, Complex Script Font: 11 pt
						تعاني المؤسسات التنفيذية في قطاع المياه من عدم تجانس في آلية تسعير المياه المفروضة على المستهلكين	Formatted: Right Formatted: Font: 12 pt, Complex Script Font: 12 pt
						تعاني المؤسسات التنفيذية في قطاع المياه من خلل إداري وتضخم وظيفي أدى تراكمه إلى تدني مستوى الخدمات المقدمة للمستهلكين	Formatted: Right Formatted: Font: 11 pt, Complex Script Font: 11 pt
						الخلل الإداري والتضخم الوظيفي في المؤسسات التنفيذية في قطاع المياه أدى إلى زيادة حجم الديون المتراكمة	Formatted: Right Formatted: Font: 11 pt, Complex Script Font: 11 pt
						الغياب الملحوظ للهياكل الإدارية الواضحة في المؤسسات التنفيذية في قطاع المياه ، أدى إلى ضعف الأداء الإداري والفني	Formatted: Right Formatted: Font: 11 pt, Complex Script Font: 11 pt
						تعاني المؤسسات التنفيذية في قطاع المياه من عدم القدرة على رسم الخطط والسياسات المستقبلية التي تضمن بقاءها و استمراريتها	Formatted: Right Formatted: Font: 11 pt, Complex Script Font: 11 pt
						تعاني البلديات والمجالس القروية من نسبة فاقد عالي تعزى لضعف الأداء الفني	Formatted: Right Formatted: Font: 11 pt, Complex Script Font: 11 pt
						تعاني البلديات والدوائر المالية من نسبة فاقد عالي تعزى لضعف التمويل لإعادة تأهيل الشبكات والعدادات	Formatted: Right Formatted: Font: 11 pt, Complex Script Font: 11 pt
	أعراض بشدة	أعراض	لا أعرف	أوافق	أوافق بشدة	الحملة	Formatted: Right Formatted: Font: 11 pt, Complex Script Font: 11 pt
						ضعف السلطة التنفيذية في تطبيق القوانين المدنية هو سبب رئيسي في تزايد حجم الديون المتراكمة	Formatted: Right Formatted: Font: 11 pt, Complex Script Font: 11 pt
						إن أعداد الموظفين العاملين في المؤسسات العاملة في قطاع المياه متضخمة وتؤدي إلى زيادة الأعباء المالية	Formatted: Right Formatted: Font: 11 pt, Complex Script Font: 11 pt

					التزايد المستمر في حجم الديون المتراكمة هو نتيجة مباشرة لارتفاع سعر المتر المكعب الواحد من المياه وعدم قدرة المستهلك على دفعها	Formatted: Font: 11 pt, Complex Script Font: 11 pt Formatted: Right
					إن النسبة بين أعداد السكان وكمية المياه التي تصلهم (Service cover) هي نسبة معقولة ضمن مصادر المياه المتوفرة	Formatted: Font: 11 pt, Complex Script Font: 11 pt Formatted: Right
					هناك ارتفاع كبير في عدد الشكاوي التي يتقدم بها المستهلكين من نواحي (أسعار المياه، جودتها، فترات انقطاعها)	Formatted: Font: 11 pt, Complex Script Font: 11 pt Formatted: Right
					تعاني المؤسسات التنفيذية في قطاع المياه وخاصة البلديات والوحدات التابعة لها من عدم كفاءة الموظفين ونقص المهارات الفنية والإدارية لديهم	Formatted: Font: 11 pt, Complex Script Font: 11 pt Formatted: Right
					يتوفر لدى المؤسسات التنفيذية في قطاع المياه وصف واضح للموظفين والوظائف	Formatted: Font: 11 pt, Complex Script Font: 11 pt Formatted: Right
					إن النسبة بين أعداد الموظفين العاملين في الدوائر والبلديات ونسبة السكان الذين تصلهم الخدمة (Staff productivity) هي نسبة معقولة ومتناسبة مع حجم الخدمة	Formatted: Right Formatted: Right
					تلتزم البلديات والوحدات التابعة لها بالتعرفة والأسعار المنصوص عليها في التشريعات المائية في حال توفرها	Formatted Formatted
					تمتاز المؤسسات التنفيذية بتوفر معادلة معتمدة لتسعير المتر المكعب الواحد من المياه	Formatted Formatted
					البلديات والدوائر الإدارية في قطاع المياه قادرة على تغطية تكاليفها وتوفير رواتب موظفيها	Formatted Formatted: Right
					تقوم الحكومة والمؤسسات التنفيذية بمراجعة آليات التسعير كل 5-10 سنوات	Formatted Formatted: Right
					تقوم مؤسسات قطاع المياه بتجنيد الدعم المالي لدعم قطاع المياه وتزويده بالاحتياجات الضرورية الفنية والإدارية	Formatted: Right Formatted
					تمتاز وحدات ودوائر المياه في البلديات بقدرتها على إدارة الأزمات وخاصة ضمن الظروف السياسية الحالية	Formatted: Right Formatted
					هناك حاجة للإبقاء على تبعية قطاع المياه إلى القطاع العام كلياً بالرغم من النتائج الحالية لهذا الترتيب	Formatted: Right Formatted
					هناك حاجة للإبقاء على تبعية قطاع المياه إلى القطاع العام جزئياً بالرغم من النتائج الحالية لهذا الترتيب	Formatted: Right Formatted
					الجملة	Formatted Formatted
			أوافق	لا أعرف	أعارض بشدة	Formatted: Right
			أوافق بشدة			Formatted Formatted
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						تتمتع المؤسسات الأهلية و غير الحكومية بدور فعال في حل مشاكل المياه المختلفة وخاصة في الجانب المالي و البحثي	Formatted: Font: 11 pt, Complex Script Font: 11 pt Formatted: Right
القسم الخامس الترتيب المؤسسي المستقبلي الملائم لإدارة قطاع المياه							
						الرقم	
						أعاض بشدة	
						أعاض -	
						لا أعرف	
						أوافق بشدة	
						أوافق	
						الجملة	
						الترتيب المؤسسي المستقبلي الملائم لقطاع المياه في الضفة الغربية هو الشراكة بين القطاع العام و الخاص على حد سواء تحت إطار مؤسسي واضح	Formatted: Font: 11 pt, Complex Script Font: 11 pt Formatted: Right
						خصخصة قطاع المياه في الضفة الغربية هو الخيار الأفضل لإعادة ترتيب الوضع الإداري والمؤسسي الحالي	Formatted: Font: 11 pt, Complex Script Font: 11 pt Formatted: Right
						هناك حاجة لإشراك القطاع الخاص في إدارة قطاع المياه و لكن بدور جزئي خدماتي فقط	Formatted: Font: 11 pt, Complex Script Font: 11 pt Formatted: Right
						إن خصخصة قطاع المياه ستؤدي إلى تقليل حجم الديون المتراكمة	Formatted: Font: 11 pt, Complex Script Font: 11 pt Formatted: Right
						إن خصخصة قطاع المياه سيكون له أثر إيجابي على تحسين نوعية الخدمات وتدريب وزيادة كفاءة الموظفين	Formatted: Font: 11 pt, Complex Script Font: 11 pt Formatted: Right
						إن خصخصة قطاع المياه تعني ارتفاع الأسعار واحتكار المصادر و بالتالي ضعف قدرة المستهلكين على دفع المستحقات المالية المترتبة عليهم	Formatted: Font: 11 pt, Complex Script Font: 11 pt Formatted: Right
						هناك حاجة لإنشاء وزارة للمياه بحيث تضم تحت مظلتها الجانب الحكومي التشريعي والجانب التنفيذي، الفني، والإداري	Formatted: Font: 11 pt, Complex Script Font: 11 pt Formatted: Right
						يترتب على تقييم وإعادة هيكلة المؤسسات العاملة في قطاع المياه أعباء و جهود كبيرة و بالتالي لا يوجد حاجة للتقييم و إعادة الهيكلة الإدارية ومن الأفضل إبقاء الوضع على ما هو عليه	Formatted: Font: 11 pt, Complex Script Font: 11 pt Formatted: Right

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