**Deanship of Graduate Studies**

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# Evaluation of Water Tariff System at Bethany Municipality: An Exploratory Study

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# Evaluation of Water Tariff System at Bethany Municipality: An Exploratory Study

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## Dedication

I would like to dedicate this research to every single soul that helped me through this journey, who supported me and lighten my eyes toward Success.

**With all my love and respect**

**Afaf Ali Faroun**

## Declaration:

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

Signed: Afaf Faroun

Afaf Ali Mohammed Faroun

Date: 27 /8/ 2019

# Acknowledgment

From the aspect of thankful, I firstly thank GOD who gives me the patience and power toward progressing this work.

Afterward, I solely extend piles of thanks to Dr. Ibrahim Awad my supervisor for his constant efforts which led to the success of this work.

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Special thanks and gratitude are extended to my family who supported me and enhanced my faith in the job I'm doing.

## Terms of the study:

1. *Water Tariff*: is a price assigned to water supplied by a public utility through a piped network to its customers. (Grafton, et al. 2015)

2. *Water loses*: water that has been produced and is "lost" before it reaches the consumer. (Grafton, et al. 2015)

3. *Technical efficiency:* a given utilized set of inputs that used to produce an output with lowest cost of operation. (Liu, 2013)

4. *Increasing block tariffs (IBTs):* The Prices Expansion of the water tariff, It provides two or more prices for water used and widely used in the developing world, are claimed to produce desirable income transfers, discourages wasteful use, promotes economic efficiency, and assure access to sufficient water for basic sanitation. (Boland & Whittington, 1997)

*5. A water supply system*: is a system for the summation, conveyance, curing, storage and distribution of water from source to consumers, for example, homes, commercial establishments, industry, irrigation facilities, and public agencies for water-related activities (fire-fighting, street flushing and so forth). (Blank, 2008)

*6. Efficiency*: the concept of efficiency relates to the allocation of resources in the economy, within the water sector, efficiency is often tested in a "restricted" sense and relates to the technical and commercial efficiency of utility companies. (Kim, 2016)

7. *Cost recovery:* defined as the method to recovering an expenditure, which a business takes on, is both a specific and general term. (Kim, 2016)

8. Expenses: an expense is the cost of operations that a company incurs to generate revenue. As the popular saying goes, "it costs money to make money. (Beecher, et al. 1993)

9. *Water Bill*: the amount one must pay to use water and sewer services each month. Normally, a municipality provides water and sewage, but this is not always the case. Water bills usually are based upon one's usage, such that those who use more water are charged more. (Grafton, et al. 2015)

## Abstract:

The overall objective of this study is to show if the water tariff, which is applied at the Bethany municipality, is proper and applicable by achieving these main objectives: showing the reality of the current water tariff and discovering if it reaches the full cost recovery. In addition, the study is intended to show if the Bethany community has awareness of the water tariff and other factors through using questionnaire for the households, which have effects on water tariff system, such as: technical efficiency and water losses.

In order to achieve the main objectives of the study, the researcher used the descriptive analytical approach. A mixed method of research, the qualitative as a main method and the quantitative as the supportive method of the study, was used. Two main data collection tools were used: the interview and the questionnaire. The interview was conducted with experts in the water service, whereas the questionnaire was distributed among community families in order to evaluate their awareness. In this regard, the sample of the interview was nine experts that were interviewed by the researcher, and the sample of the questionnaire was 87 households.

The main findings of the study came as the water tariff system implemented by the Bethany municipality took into consideration the cost of technical water losses, multiple water resources, and energy used; as well as administrative and technical expenses. The study showed a lack of household awareness; whereas there are thefts of water by citizens (commercial losses) and lack of cooperation by the households towards the municipality to report such thefts. This is a big burden on the Bethany municipality where it pays the price of stolen water. In addition, the lack of multiple households' awareness regarding shared meters for several houses causes an increase of the value of the domestic water bills because the municipality use of the volumetric tariff system therefore causes an accumulation of debts due to the accumulation of bills and the households' failure to pay.

According to these results, the study recommends that the municipality of Bethany should work on reconsidering the current water tariff system. The municipality needs to raise funds toward renovation and maintenance of the water networks in Bethany. In addition, it must show all required solutions: such as, monitoring shared water parameters, controlling water theft, and detecting networks of water. Finally, the study also

recommends communication with the local community to raise awareness of the water tariff and the factors that affect it and to urge the households to use an independent meter and report theft in case of occurrence.

**تقيم نظام التعرفة المائية في بلدية العيزرية (دراسة استكشافية)**

**المشرف : د . ابراهيم عوض**

**الطالب .عفاف علي محمد فرعون**

## الملخص

الهدف العام من هذه الدراسة هو استكشاف إذا ما كانت تعرفة المياه المطبقة من قبل بلدية العيزرية مناسبة وقابلة للتطبيق في بلدة العيزرية أم غير مناسبة ، وذلك من خلال تحقيق الأهداف الرئيسية التالية: تقييم التعرفة المائية المطبقة حاليا من قبل البلدية ومدى تحقيقها لمبدأ التغطية الكاملة للتكاليف. بالإضافة إلى إظهار مدى وعي المواطنين في بلدة العيزرية تجاه التعرفة المائية و العوامل المؤثرة فيها مثل نسبة الفاقد والكفاءة التقنية لشبكة المياه في البلدة. من أجل تحقيق الأهداف الرئيسية للدراسة، استخدم الباحث المنهج التحليلي الوصفي. حيث استخدم الباحث طريقة مختلطة للبحث، النوعية كطريقة رئيسية والكمية كوسيلة داعمة للدراسة لذلك، تم استخدام أداتين رئيسيتين لجمع البيانات: المقابلة والاستبيان، حيث أجريت المقابلات مع خبراء ومسئولين عن توفير خدمة المياهفي سلطة المياه و بلدية العيزرية ، و تم توزيع الاستبيان على أرباب أسر مجتمع بلدة العيزرية من أجل تقييم وعيهم. وقد أجريت مقابلات فردية مع 9 خبراء قابلتهم الباحثة، كما تكونت عينة الدراسة من 87 أسرة من مجموع عدد الأسر في مدينة العيزرية.

وقد جاءت أهم النتائج التي توصلت إليها الدراسة بأن نظام تعرفة المياه المطبق من قبل البلدية يأخذ في عين الاعتبار تكلفة فاقد المياه التقني، وموارد المياه المتعددة، والطاقة المستخدمة بالإضافة إلى المصاريف الإدارية والتقنية. بالإضافة إلى ذلك أظهرت الدراسة ضعف بالوعي العام لدى المواطنين حيث ان هنالك عمليات سرقة للمياه من قبل المواطنين (الفاقد التجاري)، وعدم تعاون من قبل المواطن مع البلدية في التبليغ عن هذه السرقات وهذ يشكل عبءً كبير على البلدية حيث تتحمل البلدية دفع ثمن المياه المسروقة بالإضافة إلى عدم وعي المواطن بأن العدادات المشتركة لعدة مساكن تتسبب بزيادة قيمة فاتورة المياه المنزلية بسبب تطبيق البلدية لنظام التعرفة المتصاعد مما يسبب تراكم في الديون بسبب تراكم الفواتير وتقاعس المواطن عن الالتزام بالدفع.

توصي الدراسة بأن تعمل بلدية العيزرية على إعادة النظر في نظام التعرفة المطبق حاليا في البلدية بالإضافة لرصد ميزانيات من أجل تجديد وصيانة شبكات المياه في العيزرية. هذا بالإضافة للبحث عن حلول للتقليل من نسبة الفاقد التقني والتجاري ومشكلة العدادات المشتركة، كما توصي الدراسة بالعمل على التواصل مع المجتمع المحلي لنشر الوعي تجاه التعرفة المائية والعوامل التي تؤثر بها ومحاولة حث المواطن على الالتزام باستخدام عداد مستقل والتبليغ عن السرقات في حال حدوثها.

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# Chapter One

# General Framework of the Study

## 1.1. Introduction:

West Bank is suffering from a real water crisis, which is due to the increased demand for water, which led to a continuous deficit in water resources, especially underground water reservoir, which is reflected on the quality and quantity of the water in West Bank.

One of the main reasons that caused the decreased of the crisis of water in West Bank is the pollution, and therefore, the polluted water that cannot be used for drinking, bathing, industry or agriculture effectively reduce the amount of usable water within a given area.

Putting suitable and effective water tariff system is one of the most important tool that is necessary to manage the different water recourses, where is putting an effective water tariff system contributes in rationalize water consumption in deferent sectors, and that's lead to contribute in serving out the water policies that followed.

Actually there is no effective tariff system has put by the water authority that are responsible about water management in Palestine, there is no system that meets conditions of scientific foundations and principles, which lead to raise the avails level, and manage the water rescores effectively. It should be pointed out that the recent water tariff has been created during the Israeli occupation era in west bank and Gaza, and hasn’t been changed except in a few municipalities, where they tried to raise some categories and merged some other categories to become meaningless, the current tariff doesn't courage the process of water conservation and it is not appropriate with cost recovery, Operation, maintenance, and consumption. (Awad, et al. 2017)

In addition, this is due to the water loss rate, which is up to more than 50% in some areas, and the high cost of water, which come by the Israeli company "Meckeroat". it forecasted from the future tariff design or structure to be reciprocal structure to all provinces of West Bank and Gaza strip, where it reflects the differences of the production of water in the

different areas which supply us with water, and the suggested water tariff system will based on the following principles: (1) the continuity of water utilities, ,(2) the proposed water tariff should inspire frugality water, through raising the madness to those who expend massive amounts of water, (3) thrift of the base needs of water viands with low cost whereas the loss will compensate from the denomination who used a considerable amounts of water. (Blanc, 2008)

In general Bethany municipality depends on two major sources of water in order to supply the whole towns of drinking water, these two sources are:

The first source is buying drinking water from the supplying point that comes from Bethany well NO.3 that follows water department of the West Bank whereas the other source of supplying the town of drinking water is the Israeli company "JEHON".

According to the formal archives of Bethany township as a proof of the study, the total amount of water the municipality has bought and pumped it at the water network has reached a 2018 to (1,168,547 m3) where the proportion of a visual of buying from Bethany water NO.3 was (29%) and the proportion of a visual of buying water from the Israeli company (JEHON) was (71%).

The town of Bethany suffers from high water loss rate that reached (50%) in 2016 and that rate is the highest in the west bank which followed by Jenin city where the water loss there reached (49%).

That means that the municipality of Bethany town loses every year about (50%) of sums of money that supposed it collected as the water prizes from people who buy water and its services from the municipality, on the other hand, a high percentage of people at the town don't pay water bills and that caused high amount of debt on the municipality which reached at the end of year 2017 about 45,000,000 NIS. (Bethany Municipality, 2019)

In this thesis, we will try to detect the water tariff framework which is utilized at Bethany township and if it fulfills the full coast reclamation of water, competence, fair treatment and sustainability. This thesis will discuss the reality of the current water tariff system in the West Bank of the drinking water in general and in Bethany town in specific, and it will show the scientific and technical defect and imperfection of it, also it will try to maintain clarification of the mechanism of the water tariff, the research based possessions, and the basic goals, on which the water tariff is based.

## 1.2. Justifications of the study:

1. Water tariff at Bethany municipality does not cover the total costs of the operating disbursements.

2. The scientific bases have not taken in consideration during building the structure of the current water tariff in Bethany municipality.

3. High water debt ratio at the Bethany municipality.

4. Lack of awareness toward water tariff at Bethany town.

## 1.3. Problem statement:

The master problem of Bethany City Hall is people's soft affordability of water, which along with the non-attendance of governmental backup, causes a shortage of profit to the Township. The water bills are one of the main sources of income at the municipality; during the last few years, the average percentage revenue of the water bills was about 30% because of the high percentage of consumers who were not able to or did not want to pay. Social conflict and a lack of cooperation became common.

The researcher will try to discuss and reconnoiter if Bethany municipality have taken in consideration these factors: (multiple water sources, energy use, households awareness, water loss, and technical efficiency) when they designed the model of water tariff which is applied at the municipality and if it proper with the social and economic situation at Bethany town, otherwise, if the water tariff which is applied at the municipality achieves cost recovery, equity and efficiency.

## 1.4. Study Objectives:

The overall objective of this study is to show up if the water tariff, which is applied at Bethany Municipality is proper and applicable and reach the cost recovery, and that will be through achieving the following goals:(1) to show up the reality of current water tariff which is applied at Bethany Municipality (2) to show up if people of Bethany have awareness towards water tariff.

## 1.5. The specific objectives of the study are:

1. To investigate the level of household's awareness in Bethany towards water tariff system in specific and some water issues that related to the status of water in Bethany town in general and these issues are: water losses and technical efficiency.

2. to evaluate the water tariff which is applied in Bethany municipality as an evidence of the study, and if the municipality takes into account these elements when they have designed the model of water tariff that they apply, and these elements are: multiple water resources, energy use, technical efficiency and expenses related to it, and water losses.

## 1.6. Questions of the study:

1. Do households in Bethany town have awareness towards water tariff structure and other factors that may affect the water tariff system?

2. Does Bethany municipality apply proper water tariff with taking into consideration the cost recovery?

## 1.7. Boundaries of the study:

1. Spatial boundaries: This study covers Bethany town, and discusses the aspects that related to water tariff in Bethany Municipality.
2. Temporal boundaries: this study is conducted during the period from September.2018 to September.2019.

## 1.8. Hypotheses of the study:

We have two main hypotheses of our study as shown below:

1. People have awareness towards water issues in Bethany (water tariff\ water losses\ technical efficiency).

2. There is a proper and applicable water tariff system in Bethany, this main hypothesis will be examined through the following minor hypotheses:

2.1. Experts at Bethany municipality have taken into consideration the multiple water sources (Bethany Well, Mekoroet, water authority). When they designed the current model of water tariff.

2.2. Type of energy that used in water production and distribution into Bethany water network have an effect onto water tariff at Bethany Municipality.

2.3. When experts designed the current water tariff system at Bethany municipality they have taken into consideration the full cost recovery that includes the administrative and technical expenses in order to keep the sustainability of the technical efficiency of the water network.

2.4. Water losses in Bethany affect the current water tariff, which is applied at Bethany municipality.

## Chapter Two:
## Theoretical background

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**2.2. Definition of water tariff.**

**2.3. The objectives of water tariff policies.**

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# Chapter Two:

## Theoretical background

### 2.1. Introduction:

There has been significant progress towards understanding that water does not just have an economic value, but also social, religious, cultural, and environmental values. In fact, these values depend on each other frequently (Rabi& Mimi, 2013).

The notion of justice in using and managing water is a doubtless concept, therefore, putting an intellectual water tariff for water uses that is symmetrical between the costs of providing utilities and profit margin, which covers managerial costs. In addition to that, when designing rational water tariff, we should take into consideration the social and environmental priorities (Jabber, 2004).

Water tariffs come into being in various ways. Occasionally the tariff is simply inherited from a prior period. If the existing tariff has not been controversial, and if no outside lending agency is pressing for change, water managers may choose to deal with current needs by making the smallest possible changes in the existing structure (Joanna L. 2013). In other cases, the tariff may be determined by a formula embodied in national legislation (e.g., Ukraine) which may also be administered and regulated by a national regulatory body (e.g., Colombia). These constraints reflect a social concern over the fairness of water tariffs, but they are rarely revised to account for changing circumstances or rising costs. Whatever the motivation, legislative and regulatory constraints often leave little opportunity for an individual water supplier to consider the broader issues of tariff design, at least in the short run (Boland and Whittington, 1997).

Barring for these special cases, water proxies must, from time to time, consider the proper design for the tariff. The process is often complex and can involve, in addition to the water agency itself, outside consulting firms, lending institutions, political leaders, various stakeholders from the user population, and sometimes local and/or national legislatures (Richard and Johnston,2005). Much of the complexity derives from conflicts among the various objectives and considerations that different parties bring to the discussion.

**2.2. Definition of the water tariff:**

A water tariff (often called water rate in the United States and Canada) is a price assigned to water supplied by a public utility through a piped network to its customers. The term is also often applied to wastewater tariffs. Water and wastewater tariffs are not charged for water itself, but to recover the costs of water treatment, water storage, transporting it to customers, collecting and treating wastewater, as well as billing and collection. Prices paid for water itself are different from water tariffs. They exist in a few countries and are called water abstraction charges or fees. Water tariffs vary widely in their structure and level between countries, cities and sometimes between user categories (residential, commercial, industrial or public buildings). The mechanisms to adjust tariffs also vary widely (Dinar, 2000).

Most water utilities in the world are overtly owned, but some are privately owned or administered. Utilities are network industries and natural monopolies. Economic theory predicts that unregulated private utilities set the price of their product at a level that allows extracting a monopoly profit. However, in reality, tariffs charged by utilities are regulated. They can be set below costs, at the level of cost recovery without a return on capital, or at the level of cost recovery including a predetermined rate of return on capital (OECD, 1987) in many developing countries tariffs are set below the level of cost recovery, even without considering a rate of return on capital. This often leads to a lack of maintenance and requires significant subsidies for both investment and operation. In developed countries water and, to a lesser degree, wastewater tariffs are typically set close to or at the level of cost recovery, sometimes including an allowance for profit. (Junguo, 2013).

In general, water tariff is recognized as one of the most important non-structural incentive measures for demand management to achieve the objective of efficiency and

sustainability of scarce water resources. Water pricing aims at achieving financial sustainability rather than an instrument for water allocation (Muller and Mike, 1999).

### 2.3. The objectives of water tariff policies:

Water has an economic value and should be recognized as an economic good(Junguo, 2013).However, Water is not a normal economic good; it is too special to be considered compared with other economic goods. Water has a combination of characteristics that make it different from any other good and should be dealt with in a very special way although individually these characteristics are maybe not so restrictive (Lefebvre et al. 2005).

In public, the main principle we should take it in to account when we design the water tariff is obtaining the economic efficiency (Lifongo and Gaskin,2009 ) and that means the water tariff should lead the water use -with taking into consideration it as a rare natural resource- to categories and sectors which we can gain the maximum profit from them, and that means the marginal revenue should be equal to the marginal benefit, therefore, when putting up or designing the water tariff by commissions and institutions that concerned of this cause (American Water Works Association,1988) it must achieve these important goals:

- Cost recovery: All who consumes drinking water should pay for it, this is the basic role which the water tariff build on, for this, water tariff must recover the costs in which revenues should be more than costs with a simple limit, in addition, commissions and institution who provide water services for people should increase the revenues until it reaches full cost recovery in the following stages (Water Authority, 2003): * The first phase: revenues that cover operation and maintenance costs. *The second phase: revenues that cover operating and maintenance costs in addition to replacement costs due to the water network deterioration (American Water Works Association, 1988).

Cost recovery is important for the continuation of the water facilities, without revenues which should cover the costs required, the efficiency of the water facility decreases then the production will be delayed, therefore, the drinking water facilities differ in how much can they recover costs, whereas some facilities only recover the first phase but others

recover the first and second phase, that depends on the policy of the government and how much it contributes to protecting poor families (Water Services: Planning and Information: Business Intelligence Support,2015-2016 )

Many countries are interested in adopting the principle of recovering costs as a base to design the water tariff, thus, we find that the Palestinian Water Authority seeks to adopt a water tariff system aims to recover the entire cost, ( Water Authority, 2003), In the Kingdome of Jordan the water tariff for domestic uses is supported by the government, and water prices which collected from people just cover a small percentage of operating and maintenance costs of water projects (Bani Hani, 1995). Furthermore, in Saudi Arabia, the water tariff recovers a very small percentage of the actual cost of producing and distributing drinking water (Abdurrahman, 2002).

In Iran, the water tariff in urban areas is set at half the total costs, with the state cover the other half (that include operating and maintenance costs in addition to replacement costs due to the water network deterioration), this condition provided in the fair Water Distribution Act 1982, and as for the urban areas, 1990 law permit to cover the half of the full cost, which includes capital costs and the replacement costs due to the water network deterioration (Faroqi, 2002).

On the other hand, in Yemen which suffers from a serve water shortage, it is a general rule that the water tariff is set to cover operating, maintenance and replacement costs due to the water network deterioration, while the government funds new projects, replacements and expansions of the network, which take into consecration the increased value to the system, the expectations is that in the future the tariff will cover the full operations costs (the Republic of Yemen, 2003).

- Social justice: social justice is one of the most important principles to be taken into consideration when setting the water tariff because it takes into account the humanitarian and social impact on consumers when setting water prices, which means setting the tariff at a level those families with limited resources can afford. (Muller and Mike, 1999).

Strengthening social justice could be achieved through the incremental water tariff, where the price of one cubic meter of water for essential needs is less than the one cubic of water of high consumption. Thus, in this case, high-level families (high consumption),

pay relatively more than the low-level families (low consumption), and this is useful because the consumers should pay for the costs of the operating and maintaining the drinking water network. We have to pay attention to low-level consumers, who do not have the ability to pay for services (Palestine Economic Policy Research Institute, 2013).

### 2.4. Types of water tariff:

A tariff structure is a set of practical rules used to mark the conditions of service and the monthly bills for water users in several categories or classes. A water user's monthly bill may include two distinct components: a part based on the volume of water used, and another part based on factors other than water use (Boland and Whittington,1997). Therefore, we can say that water pricing is recognized as one of the most important non-structural incentive measures for demand management to achieve the objective of efficiency and sustainability of scarce water resources. Water pricing aims at achieving financial sustainability rather than an instrument for water allocation. Only if the financial costs are recovered can an activity remain sustainable. If water is free, the water provider does not receive sufficient payment for its services.

Consequently, the provider is not able to maintain the system adequately and, hence the quality of services will deteriorate. Finally, the system falls, people have to drink dangerous water or pay extravagant amounts of money to water vendors, while wealthy and influential people receive piped water directly into their houses, at subsidized rates. Thus, the water-for-free policy often results in powerful and rich people getting water cheaply while poor people buy water at excessive rates or drink unsafe water. To maintain the water supply system, help the poor to drink safe water and keep the society secure, the government has to give subsidy to many sectors. However, the subsidy is really a good way to solve this free water dilemma because of the long-time subsidy; people cannot realize the fact that water should be recognized as an economic good. In addition, because of the low price of the water, a large quantity of water is consumed easily with a large quantity of waste produced by the consumers, which will worsen water scarcity in their life ( Hoekman, 2011).

In general, the water tariff regulation that adopted in the world countries includes two main types, the first type is single-part tariff, and the other is two-parts tariff, which include fixed part and the other part is mutable (Savenije and Jianxin Xu b, 2002), the

following table shows these types of water tariff and their subdivision, with mentioning descriptions, advantages and disadvantages of them:

**Table (1): pricing and systems.**

| System | Rate Mechanism | Description | Advantages | Disadvantages |
|---|---|---|---|---|
| Flat Rate | Flat Rate or Fixed Rate | A specified rate is charged, usually per month, regardless of the amount of water used. | Flat rates systems can appear to be socially equitable as everyone pays the same rate. It is administratively simple and no metering is required. | **It fails to encourage water conservation. Water usage rates can run 70% to 80% higher than under volumetric rates.** |
| Volumetric system | Constant Unit Or Uniform Rate | A specified rate is charged for each unit of water use. Those who use more water will pay more, but the rate doesn't change depending on the amount of water used. | This too can also appear to be socially equitable. Water users are also charged based on what they consume. This is of more user-pay approach. | **Metering is required for this system to be put in place. Rate structure does not reward those who use less water or encourage heavy water users to conserve.** |
| | Declining or decreasing block rate | Provides low-cost water for economic applications requiring heavy water use. | Not socially equitable as those who use little water pays for their water at higher rates. No incentive to conserve water as the lowest cost of water is the last unit of water used. | |

| | | | | |
|---|---|---|---|---|
| | Inclining or Increasing Block rate | The rate charged increase as more volumes of water are used. Can be implemented by establishing categories such as basic use, normal use, heavy use or excessive use. | Can be socially equitable if special lifeline rates, credits or rebates are provided. Another option is to provide a base amount of water for free or at low cost. Because charges are higher for use beyond a minimum amount, the system creates an incentive to conserve water. Addresses the problem of "free-riders." | **The system can create revenue volatility for water suppliers and utilities. It can also create some equity difficulties. For example, the same pricing scheme applying to a family of two as to a family of fix.** |
| | Complex Pricing | The rate charged is based on a combination or all of the above | Dependent on the combination. | **Dependent on the combination.** |

Resource: R. Quentin Grafton*, Long Chu and Tom Kompas study, Optimal water tariffs and supply augmentation for cost-of-service regulated water utilities (2015).

Theoretically, water tariff should cover these three main goals: (1) achieving economic efficiency, (2) attaining public equity (3) cost recovery (Boland and Whittington, 1997). However, practically water tariff designer be faced with many difficulties in their way to achieve the previous goals, and that because of the contradiction between them. Therefore, the principle of achieving social justice interferes with the principle of economic efficiency.

On the other hand, achieving the principle of cost recovery interferes with the other two principles.

From one hand the costing criteria, which should retrieval, differ from one water provider to the other, where there is not any specific standard to determine the items and elements which are the costs have built on.

That maybe leads to significant cost estimations and then augment of water tariff in order to cover the costs and that interferes with the principle of the economic efficiency, and that because the estimated cost does not reflect the actual cost, as well, achieving social justice principle may lead to the inability of the water services provider to achieve the cost recovery (R. Quentin et al. 2015).

Achieving the balance between the three principles, which the water tariff has built on the social justice, economic efficiency, and cost recovery, it represents the cornerstone of creating an efficient water tariff ( Hoekman, 2002).

Therefore, creating water tariff design or pricing mechanism depends on many factors, these factors are public awareness, water losses, accounting system, technical efficiency, energy use, and multiple water sources and we will talk about all these factors in details later in this study.

### 2.5. Water tariff in the West Bank:

It should be noted that evaluating the efficiency of water tariff which is applied in the municipalities of the west bank be through achieving the goals which it set for, and in light of this we will discuss the most important elements which are contributing in evaluating the current water tariff, and these elements are:

- Cost recovery and the drinking water sales proceeds:

The table number (1) shows that the total quantities of the water supply of domestic sector in the West Bank urban governorate from the years 2010-2015 it continued to increase, and that is due to the Overpopulation during these years.

**Table (2): Quantity of Water Supply for Domestic Sector in the West Bank urban Governorate /Year 2010 – 2015.**

| Year | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|
| Consumed Water (million m3 ) | 119.6 (million m3 ) | 102.8 (million m3 ) | 100.9 (million m3 ) | 93.9 (million m3 ) | 88.3 (million m3 ) | **85.0 (million m3 )** |

Source: Palestinian Water Authority/ reports (2010-2015).

Table number two shows the efficiency of water bills collecting in urban municipalities in the West Bank by the years 2014-2016, and it has been observed that the percentage of bills collection doesn't reach the required level.

In fact, the total costs of producing drinking water are much more than revenues of collecting water bells, which indicates that the efficiency of the current water tariff not on the required level, and that actually causes fiscal deficit in water management sectors in municipalities over the West Bank governorates, and that create deterioration of the financial situation in these municipalities, in addition to that, unfortunately these municipalities have lack to any sources which can cover this deterioration, and that prohibit the water departments at municipalities to develop their management, and doing their job in supplying water for consumers in an efficient way.

From this point, we can understand the importance of designing a new model of water tariff which can help in full cost recovery(Al-Ramhi, 2010).

**Table (3):the efficiency of water bills collecting in urban municipalities in the West Bank -Years 2014-2016**

| Governorate | 2016 | 2015 | 2014 |
|---|---|---|---|
| Jericho | 73% | 71% | **50%** |
| Hebron | 55% | 74% | **66%** |
| Jenin | 54% | 102% | **52%** |
| Qalqiliya | 68% | 55% | **53%** |
| Nablus | 71% | 71% | **71%** |
| Bethlehem | 85% | 74% | **69%** |
| Tubas | 58% | 67% | **65%** |

| | | | |
|---|---|---|---|
| Jerusalem Water Undertaking | 92% | 108% | **98%** |
| Salfit | 88% | 100% | **82%** |
| Tulkarem | 46% | 50% | **51%** |

Source: Palestinian Water Authority/ reports of (2014, 2015, 2016).

- Blocks of water tariff:

Blocks of water tariff around the West Bank townships are diverse; some water managements split the blocks for two, three, or even five. This division points to the absence of a unified water tariff system which can regulate and unites the consumption categories, and this division should depend basically on the full cost recovery and should take on consideration social, economic conditions, and the income level of the consumers (Jaber,2004).

2.5.1 Minimum charge amount of water tariff:

Generally, setting fiscal fees which is stable is one of the methods that helps the goals of water tariff, especially if this fees have put to cover the executive expenses, for instance (reading water meters, issuing invoices, water bills collection, stationery) whereas these fees collect in isolation from the total consumption of water.

We observe that most of the municipalities in the west bank have set fixed fee which is not related to the consumption quantities, and these fees differ from region to other, for example, it can reach about 60 NIS per two months in Biereh whilst it is just about ten NIS in Anata near Jerusalem, this differences in collecting the fixed fees in the West Bank urban municipalities is one of the indicators that show the defect in setting water tariff mechanism, in addition of misunderstanding of the tariff policy and the goals of is it( Palestinian Water Authority, 2011).

2.5.2 Water Rationing:

Most of the municipalities of the West Bank apply the increasing block tariff to ration the use of water via increasing the price whenever the consumption increase, especially when the consumption is huge, but when we look at the reality of the water tariff system which applies in the West Bank municipalities, we will find that the principle of water rationing is not considered, because in some municipalities as an example they set the first category from (0-40) m3, that shows that the consumer who consumed one cubic meter of drinking

water pays the same price that the consumer who consumed 40m3 of drinking water, and that leads the consumer to indifference in water conservation, especially if the consumption is less than 40m3 per month it (Palestinian Water Authority, 2011).

2.5.3 Increasing block tariffs (IBTs):

It means the Prices Escalation of the water tariff, it provides two or more prices for water used and widely used in the developing world, it claimed to produce desirable income transfers, discourage wasteful use, promote economic efficiency, and assure access to sufficient water for basic sanitation (Folifac, F & Gaskin, S ,2011).

In Jerusalem Water Undertaken as an example, the price of the first category has been identified as 4.50 NIS for domestic uses and 5.60 NIS for industrial uses, whilst it reaches 9.00 NIS for domestic, commercial and industrial uses after 60 cubic meters per month. The following table shows the categories and the blocks Prices Escalation of the water tariff in Jerusalem Water Undertaken:

**Table(4): the new water tariff system that approved from 1\1\2012 in Jerusalem water undertaken**

| Consumption category/m3 | Domestic NIS | Industrial NIS | Commercial NIS |
|---|---|---|---|
| 0-10 | 4.50 | 5.60 | **5.60** |
| 10.1-20 | 4.50 | 5.60 | **5.60** |
| 20.1-40 | 5.60 | 6.80 | **6.80** |
| 40.1-60 | 6.80 | 8.10 | **8.10** |
| 60+ | 9.00 | 9.90 | **9.00** |

***** This information according to the Palestinian water sector regulatory council.

2.5.4 Reading water meters: the period for reading water meters differs from one municipality to another, some municipalities read the water meters every two months whilst most of the West Bank municipalities read them monthly, and this is another indicator that shows the unification of the West Bank municipalities under unified water tariff system (Palestinian Water Authority, 2011).

2.5.7. Average of the water tariff in some of the West Bank municipalities:

**Table (5): Average of the water tariff in some of the West Bank municipalities**

| **Municipality** | **Water tariff \ NIS** |
|---|---|
| Nablus | **6.13** |
| Halhul | **5.07** |
| Qalqeelia | **1.63** |
| Jenin | **5.40** |
| Jericho | **2.17** |
| Doora | **6.50** |
| Yabad | **4.73** |
| Araba | **2.20** |
| Baninaim | **5.00** |
| Tarqoomia | **4.99** |
| Yatta | **4.51** |
| Betounia | **8.13** |
| Bethany | **6.00** |
| Bedia | **3.45** |
| Allar | **2.78** |
| Eastern Swahra | **4.25** |
| Auja | **4.04** |
| Anabta | **3.38** |
| Azoon | **2.78** |

***** This information according to the Palestinian water sector regulatory council.

The previous table shows the average of the water tariff in the West Bank municipalities. As shown in the table, at Betounia municipality the average of the tariff reaches about 8.13 Nis. And it's the highest between the West Bank municipalities, in Qalqeeliait is the lowest with 1.63 NIS. And in Bethany, the average of the water tariff is 6.00 Nis. The reason behind thisgreat disparity is that there are many factors affect calculating the tariff and we will mention and speak about them profusely later in our study.

It is worth to mention that the difference between price of the water and the water tariff, is that price is the cost required to gain possession of something while tariff is a system of

government-imposed duties levied on imported or exported goods; a list of such duties, or the duties themselves. Tariff is a price assigned to water supplied by a public utility through a piped network to its customers. The term is also often applied to wastewater tariffs. Water and wastewater tariffs are not charged for water itself, but to recover the costs of water treatment, water storage, transporting it to customers, collecting and treating wastewater, as well as billing and collection. Prices paid for water itself are different from water tariffs.

### 2.6. Factors that affect the water tariff in the West Bank

So far, many factors affect the calculation of water tariff in general, in the following text, we'll try to totalize these factors:

2.6.1. Multiple water sources: there are multiple sources of water in West Bank, some are purchased from the Israeli company "Mekorot", others are extracted from artesian wells, and the other source of urban water in West Bank municipalities comes from shallow wells or springs and surface water (Palestinian Water Authority, 2011). This difference affects the water tariff and determining prices:

**Table (6): Annual Available Water Quantity in Palestine by Region and Source, 2015**

| Water Purchased from Israeli Water Company (Mekorot) | Springs Discharge | Water Pumped from Palestinian Wells |
|---|---|---|
| 63.8 | 40.7 | **83.3** |
| Total : 187.8 | | |

***** This information according to the Palestinian water sector regulatory council.

2.6.1.1. Water which is purchased from the Israeli company " Mekorot": In fact Palestinian water authority buys huge quantities of drinking water from the Israeli water company " Mekorot" via West Bank Water Department, this quantities which are purchased from the Israeli company " Mekorot" forms more than the half of water consumption in West Bank, many urban municipalities essentially depends on " Mekorot" as a main source of water such as: Hebron Municipality, Jerusalem Water Authority to Ramallah and Al-beirah municipality(where is the quantity of drinking water that have

purchased to Jerusalem Water Authority have reached about 83% from the total quantity of drinking water which have consumed.

Salfiet municipality, Jenin municipality, and finally Bethlehem municipality, therefore, the water department sells every one cubic meter (m3) of drinking water which is bought from the Israeli company "Mekorot" and sell it to the municipalities that offer water services for 2.38 Nis, this price is less than the cost of drinking water production in some areas like Ramallah governorate ore more than the cost of drinking water production in some other areas like Qalqealia, and this reflected clearly on drinking water prices which have sold to the consumers, in other words, " water tariff".

**Table (7): Quantity of Water Purchased from Israeli Water Company (Mekorot) in Palestine by Governorate and Year (1), 2011 – 2015 (m³)**

| Governorate | 2015 | 2014 | 2013 | 2012 | 2011 |
|---|---|---|---|---|---|
| Jenin | 3.0 | 3.0 | 2.9 | 2.3 | **2.2** |
| Tubas | 5.4 | 4.2 | 4.4 | 4.1 | **4.2** |
| Tulkarem | 0.4 | 0.5 | 0.5 | 0.4 | **0.4** |
| Nablus | 4.1 | 3.9 | 3.7 | 3.2 | **3.5** |
| Qalqiliya | 1.5 | 1.4 | 1.0 | 0.7 | **0.6** |
| Salfit | 3.0 | 3.0 | 2.8 | 2.6 | **2.4** |
| Ramallah & Al-Bireh and Jerusalem | 21.3 | 20.0 | 20.4 | 19.3 | **19.7** |
| Jericho & Al-Aghwar | 2.6 | 2.4 | 2.2 | 2.0 | **1.9** |
| Bethlehem and Hebron | 22.5 | 21.6 | 21.4 | 18.0 | **17.9** |

***** This information according to the Palestinian water sector regulatory council.

- Water that is generated from artesian aquifer: some amounts of drinking water are extracted from a restricted number of the artesian aquifer; in fact, the cost of producing one cubic meter (m3) of drinking water from the artesian aquifer is less than buying it from the Israeli water company "Mekorot" most times. The cost of producing water which comes from this source actually depends on the depth of the well, so, as the depth of the well is more, the cost of producing water necessarily will be more

The cost of producing one cubic meter (m3) of drinking water from artesian aquifer that follows water authority of Ramallah is around 3.5 Nis, this price actually is more than the cost of buying it from “Mekorot" (2.38 NIS /m3), whereas the cost of producing one cubic meter of drinking water in Tulkarem does not cost more than one NIS.

**Table(8): Palestinian Water Wells and its Annual Pumping Quantity in Palestine by Governorate and Type of Use, 2015**

| Governorate | Total | Agriculture | Domestic |
|---|---|---|---|
| Jenin | 5.2 | 0.9 | **4.3** |
| Tubas | 2.7 | 1.3 | **1.4** |
| Tulkarem | 20.8 | 11.4 | **9.4** |
| Nablus | 11.0 | 1.9 | **9.1** |
| Qalqiliya | 12.8 | 7.4 | **5.4** |
| Ramallah & Al-Bireh And Jerusalem | 2.5 | **-** | **2.5** |
| Jericho & Al-Aghwar | 12.7 | 12.7 | **-** |
| Bethlehem & Hebron | 15.6 | **-** | **15.6** |

***** This information according to the Palestinian water sector regulatory council.

2.6.1.3. Water production from shallow wells: some quantities of drinking water come from shallow wells, especially in Jenin governorate, the cost of water production from this source ranges between one NIS to 1.5 NIS, and that means the cost is less than it from the deep wells for one cubic meter of drinking water, even the cost of producing it is less than water which is bought from "Mekorot". But the quantities of water which come from this source of water is few, and much less than water which comes from the deep water wells( Water Authority, 2015).

2.6.1.4. Water production from springs (surface water): there are many water springs that supply us of drinking water, such as Ain Al-sultan spring in Jericho governorate, and Ain Al-matwe in Salfiet governorate.

The cost of the production of water from this source is the least if we compared it with the costs of the previous sources which we've mentioned, as the production cost of water from springs doesn't cost more than 0.7 NIS for one cubic meter in Jericho governorate, and the cause of that is the small amount of energy that was used to produce the water.

**Table (9): Annual Discharge of springs in the West Bank by Governorate and Year2012- 2015**

| Governorate | 2015 | 2014 | 2013 | 2012 |
|---|---|---|---|---|
| Jenin | 0.5 | 0.5 | - | **-** |
| Tubas | 0.9 | 0.9 | 0.8 | **1.3** |
| Nablus | 4.9 | 5.1 | 8.4 | **6.9** |
| Salfit | 0.2 | 0.2 | 0.3 | **0.4** |
| Ramallah & Al-Bireh And Jerusalem | 4.6 | 1.9 | 2.4 | **1.6** |
| Jericho & Al-Aghwar | 28.6 | 18.9 | 27.1 | **28.2** |
| Bethlehem & Hebron | 1.0 | 0.7 | 0.5 | **0.9** |

***** This information according to the Palestinian water sector regulatory council.

2.6.2. The type of energy that used in water production and distribution: the type of energy that used in water production and distribution significantly affect the cost of drinking water production (Blanc, 2008). Especially because the most of water wells in West Bank is very deep, and the water needs huge quantities of energy to bring it to the surface, pump it to the main reservoir, then pump it to the distribution networks. So the more depth of the well, the more need for energy for consumption, then increasing the drinking water production cost. As well, the highlands need more energy in pumping water to it than the low-lying areas. on average, the cost of producing one cubic meter (1m3) of drinking water by using electricity is about (0.4 NIS) less than producing the same quantity by using diesel (Jaber, 2004).

By the way, it's worth mentioning that the most municipalities still use diesel motors and the old electricity generators in producing drinking water, because there are many obstacles hinder connecting all water wells with the electricity network.

2.6.3.Technical efficiency: the technical efficiency has a major effect on the water tariff, where the quality of production and distribution means elucidate the varying water prices. The enhancement of water producing efficiency and using modern technology means affect the producing cost then the price of water, and vice versa, when using Inappropriate and complicated technology, the process of operation and maintenance become more complicated and therefore more expensive(Folifac and Gaskin, 2011).

The use of old devices and means, like generators, motors, pumps, and others, raise the cost of these devices maintenance and make it Periodically needs repair, and thus, this reflects on drinking water prices.

Beside using old devices, some artesian wells use modern equipment, but spare parts for this equipment are not locally available, or repairing these devices need foreign expertise, whom bringing them as fast as required is difficult.

For example, in 2002, some artesian wells that belong to Water Authority in Ramallah stopped working for more than three months, and that was as a result of some damages in pumps, and the spare parts that needed to fix them were not locally available, and having to bring them from abroad, as well bringing the competent expert to repair them (Palestinian Water Authority, 2002).

In addition, there are the Israeli usual constraints that related to get Authorization required before getting started working, and that raises the cost of maintenance and operation process, and therefore that causes the increase in water production cost.

Actually, there are a small percentage of artesian wells that use devices and equipment which are developed and modern and that equipment

Have proved its feasibility and high efficiency, therefore, reduction of drinking water production cost. For an example, the proportion of the cost of maintenance in Ramallah Water Authority is less than it in the other municipalities, and that’s because of using advanced technology, and modernizes the devices and equipment continuously (Jaber, 2004).

Moreover, modern equipment should be used, which are easy to repair, and the spare parts for it are locally available, or easy to get from abroad, therefore leads to raise the

efficiency of drinking water production and distribution, and then decrease water prices (Blanc, 2008).

2.6.4. Accounting systems that are used at municipalities: municipalities in the West Bank use different accounting systems at water departments (the Palestinian water sector regulatory council, 2016) therefore, the unification of these accounting systems would help in narrowing the disparity gap of water tariff at different provinces around the West Bank.

Water institutions which supply municipalities of drinking water, depend on different accounting systems to calculate the cost of one cubic meter of drinking water, as well as water departments at municipalities do. (Blanc, 2008)

Also, most of water institutions that work in the water sector in west bank provinces don't use modern scientific systems. Some institutions don't comprise in calculating water tariff of one cubic meter of drinking water consumption allowance of distribution networks, maintenance allowance, employees' wages, and loans benefits. As well they don't put into account the allowance of fixed assets, such as wells, reservoirs, water lines, networks and equipment which is used in production and distribution. Actually, all of these elements are fundamental in calculating the total cost(the Palestinian water sector regulatory council, 2016).

This means that the whole cost that calculated doesn't reflect the real total cost of producing and distributing drinking water, from the first phase (extraction of groundwater) to the last phase (delivering to the customer). As well not using unified accounting system at all institutions that work in water department also reflects negatively on covering the total cost of producing and distribution of drinking water, and that actually leads to financial losses (Beecher and Janice, 2002).

2.6.5. Water losses: water losses mean the quantities of water that are not calculated within the total cost of the drinking water, where is the total quantity of water, which is sold to the customer according to the bills is less than the quantities which are pumped through the water network (Folifac and Gaskin, 2011). Therefore, to cover the cost of these quantities of water losses, some municipalities hold the losses cost to the customers. As the losses rise, the prices rise. And there are two kinds of losses:

2.6.5.1. Physical or technical losses: we mean by the physical or technical losses the quantities of water, which we lose because of the dynamic pipe fracture in water pipeline, especially in the outdating water networks, leaky joints, wrong installation to the networks, connections and water meters (the inaccuracy in the measurement of the meter). (Beecher and Janice, 2002).

2.6.5.2. Commercial losses: This we lose from fresh water because of robberies, illegal links, and unregistered quantities of consumed water. (Beecher, et al. 2002).

Water losses at the West Bank constitute one of the main problems for the urban municipalities, where the drinking water losses in urban municipalities like Jenin, Tubas, and Bethany reach about 40% or 50%, and it reaches Hebron and Bethlehem about 30%. These losses during "Al-Intifada" due to the damages that Israeli soldiers caused in water networks and reservoirs, as well putting obstacles that impede repairing them. (Palestinian Water Authority, 2015).

Although the municipality should bear the water commercial losses, but actually they hold it to the customers, which leads to increase the prices of water and the variation of it between provinces, according to the loss rate.

In order to reduce the water losses in some urban municipalities, the water authority started to put appropriate solutions to do this, and that in cooperation with NGOs and donor states, so they started developing drinking water networks and main lines especially in provinces which have a high rate of water losses such as Bethany, Bethlehem, and Hebron ( Palestinian Water Authority, 2016).

It is worth mentioning in this regard that reduction of water losses requires high financial investments, that is due to the poor state of the infrastructure of the drinking water sector, in addition to the need to obtain the approval of joint water committee (Israeli/ Palestinian) before getting start implementation of the repair works of drinking water network and detection of illegal links that attached to the main drinking water lines (Jaber.2004)

The Palestinian water authority works to reduce the commercial losses by reduction of the reburies from the main lines of the drinking water network, nevertheless, people reconnect these illegal links again and again. For example, the Palestinian water authority has cut a large number of the illegal water links which have linked on the main water line

that passes through S'eer and Shyookh towns in Hebron governorate, where is the reburies average is about 40% there from the total quantities of drinking water in these areas, but people reconnected the links again (Palestinian Water Authority, 2015).

In general, there is a need to intensify efforts to face the problem of water losses, and therefore reduce the water problem on one hand, and reduce the differences in water prices on the other hand, so we can reach the rational water tariff.

**Table (10): the percentage of total Losses in the urban governorate in the West Bank by Governorate\ years 2014-2016**

| Governorate | 2014 | 2015 | 2016 |
|---|---|---|---|
| Jericho | 27% | 27% | **19%** |
| Hebron | 25% | 30% | **30%** |
| Jenin | 50% | 49% | **49%** |
| Qalqiliya | 27% | 27% | **28%** |
| Nablus | 35% | 34% | **34%** |
| Bethlehem | 37% | 42% | **37%** |
| Tubas | 24% | 26% | **29%** |
| Jerusalem Water Undertaking | 28% | 28% | **25%** |
| Salfit | 20% | 16% | **20%** |
| Tulkarem | 50% | 49% | **50%** |

*Source: Palestinian Water Authority/ reports of (2914, 2015, 2016)

2.6.6. Public awareness: public awareness of citizens which belongs to water consumption and utilization is very important and effective, because of its role in reducing the water consumption then reduce its cost (Herath et al, 2001).

In this regard, it is indispensable that the authorities who are responsible for water management to raise the public realization about water exhaustion, by installing water controller on water taps, water showers, and toilet cabinets. In addition to use private wells for home uses, also using modern irrigation methods, such as drip irrigation. As well try to allotment the water conservation tools for free or at nominal prices for water utilities customers.

## 2.7. Conclusion about water Tariff that applied in the West Bank:

Table (10) above shows water prices and the calculation bases of water tariff in the West Bank provinces, and the prices show that there is a significant variation in water prices in the West Bank provinces. In the table, we calculate the price of the first twenty cubic meters and add to it the fixed fees in the water bill for the West bank provinces, and that for the purpose of comparing between provinces.

We found that the water tariff in Jericho is the least, where is it did not exceed 30 NIS. for 20 cubic meters, and it followed by Tulkarem 70 NIS. Then Tubas 72 NIS.

On the other hand, water tariff in some regions has set down extreme numbers, such as Al-Ram town with 138 NIS. And Nablus 116 NIS. Dora 113 NIS. Qalqeelia 107 NIS. And the variance is increasing when the quantity of water that used is increased, where the first 100 cubic meters in Nablus reaches 995 NIS. And 822 Nis in Salfit while it 107 NIS. In Jericho.

This variation in prices doesn't connect with the economic and social level of the citizens in both areas, but it belongs to the calculation of producing cost of one cubic meter and the consumers commitment level in paying the water bells, water abundance or according to the local council decision without clarifying the mechanism, in addition to that, there is no categorizations for the prices of different uses of water, and the calculation of price is according to the consumption volume, and regardless of the scope of use (Aljiousi, 2002).

One of the master reasons for the diversity between the Palestinian regions is the multiple resources of getting drinking water. Where some water providers have their own ground wells, and that leads to a decrease in producing drinking water cost, in comparison with buying it from the Israeli company.

In addition to that, the distribution method has a main role in cost determination and the final price for consumer, and about the entry fees and connecting the consumer with the public water network to get water, there is a great variation between the localities and the water provider in the way of calculating this fees and determine their value. Then while the entry fees in Hebron reach 1.250 NIS. With other fees are a supplement to the bell such as the insurance, reading water meters and maintenance, on the other hand, it reaches in Nablus about 30 JD. In addition to the price of the water meter. The following

table shows the water prices and the mechanism of creating the water tariff in the West Bank:

**Table (11): the water prices and the mechanism of creating the water tariff in the West Bank**

| Region | Water source | Water distribution method | Entry fees for consumers | Price of one m3 from the source | Water tariff | Water network extension prices | Mechanism of creating the water tariff |
|---|---|---|---|---|---|---|---|
| Hebron | Ground wells+ Mekorot | Water network+ water tanks+ Water collection wells | Between 600 Nis. + 1.250 Nis. + other fees add to the bill such as insurance and reading meters and maintenance. | 2.6 NIS. | The municipalities in Hebron governorate have deferment blocks for tariff, the m3 of water is between 4 to 5.6 NIS + it decrease to reach 7 NIS | On the consumer except Dora municipality bear the cost. | **Vary from region to region but it shares the following items: the price of m3 from the resource + Wages of workers and employees Network maintenance costs, where the costs include the water losses in Hebron and Halhoul**. |
| Jerusalem/Ramallah and Berieh | Ground wells+ Mekorot | Water network | 1000 NIS Subscription fees and meter price 10 NIS for maintenance. And reading meter | 2.6 NIS | 51 NIS for the Minimum Invoice (10m3) 4.6 NIS ( 11-20 m3) 4.85 NIS (21-40m3) 6.3 NIS. (41-100m3) 6.85 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | NIS( more than 100m3) | | |
| Nablus | Deep ground wells | Water Networks | 30 JD .Entry fees 30 JD. Insurance for domestics and commercial use, 300 JD for industrial use 195 for meter | 4.5 Nis | 3.98 NIS (0-10m3) 6.7 NIS. (11-15m3) 8.7 NIS. ( 16-30 m3 ) 11.5 NIS. more than 30m3 | Its different from region to region and the least cost is 100 JD. | **The tariff has been designed according a study has done by JIZ and the municipality.** |
| Qalqeelia and Tulkarem | Ground wells | Water networks | Entry fees about 115 JD. In Tulkarem and 120 JD. In Qalqeelia 75 Nis. for the domestic insurance 2 NIS in water bell for maintenance | 1 Nis. in Qalqeelia 2.8 Nis in Tulkarem | 20 NIS ( 0-5 m3) 5.0 NIS ( 6-40 m3) 1 NIS. ( 41-70 m3) 1.5 NIS ( 71-100 m3 ) 2.5 NIS for more than 100 m3 | On the consumer | **According the local council decision** |
| Jericho | Ein Al-sultan Spring | Water Networks | Insurance ( 50 JD. For domestic use and 150 for commercial use) 275 NIS the price of the water meter 50 NIS | 1 Nis. | 1 NIS for the first 100 m3 2 NIS for every one m3 until 150 m3. 4 NIS for m3 until 250 m3 | On the consumer | **According the employees and workers wages in addition to the costs of water networks extension and administrative** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | for maintenance | | 5 NIS for m3 until 2250 m3 | | **expenses.** |

*Resources: Series of reports from the Palestinian Water Authority and the Palestinian water sector regulatory council (2014\2017)

From the previous table, it noted that there is no standard format for the items that related to the insurance fees, reading meters and maintenance, and some of these fees impose for one time such as insurance fees and the price of the meter, and other impose periodically on the water bell such as maintenance fees and reading meter.

These fees haven't been imposed in some regions as such as Jenin and Qalqeelia, actually, some municipalities impose part of these fees, and the value and kind of these fees differ from region to region.

The fees which pay for one time reaches high levels as in Jericho governorate, where the commercial insurance is 750 NIS And the commercial 1500 NIS In Nablus governorate, and as for the extensions, in general, they are on the consumer but in some regions, they are on the municipality such as in Dora.

In this regard the Palestinian Minister council has approved and issued water tariff bylaw # 1 for the year of 2013, which dedicated for the commitment of the local councils toward providing the water to the inhabitants, in addition to monitor the commitment of the bylaw contents. Herein, some of the contents of the bylaw:

In the first article, the bylaw defines some terminology toward being obvious of the words using in it, such as:

Water tariff system: a system relies on scientific and technical criteria toward imposing the cost for water.

In article # 2 at the water tariff bylaw 2013, the scope of application has been identified by which who provides and supplies water services under the supervision of local governance ministry. While, in article # 3 the bylaw detailed the objectives of water tariff used by the water suppliers, which are mainly; cost return, social equity, economic effectiveness. Upon that article # 4 from the water tariff bylaw number 1 for the ear 2013, includes that the tariff policies should be implemented to cover the user’s categories in different fields (houses, commerce, industry, and tourism). In addition, the article

mentioned that the water tariff increases depending on the increasing in the consumption quantities.

The water tariff in Palestinian cities and water suppliers should be treated upon the unify system, which follows some steps like; cost return, evaluate the price for the lowest income categories could afford, future economic cost of water for the one cube, design the hierarchy of the water tariff. Regarding changing of water tariff, it could be applicable whenever there is increase in the cost of electricity or increase in cost of purchase. In case of changing the water tariff the supplier should submit a letter for the local governance ministry in order to be transmitted for the water authority. Which will be evaluated according to the circumstances and the costs changing, in addition to the accordance of the unify water tariff system, during 30 days the water authority must reply to the letter of changing the water tariff.

Briefly, we presented some of the contents in the water tariff bylaw # 1 for the year of 2013, which are summarizes a comprehensive situation of the water tariff in Palestinian cities. The researcher found that this bylaw came towards filling the gap and inquiries by local councils regarding the legislation issues of the water tariff.

### 2.8. Overview about Bethany town:

#### 2.8.1. Introduction:

One of the administrative towns of Jerusalem governorate, located to the southeast to the Mount of Olives, 2km east of Jerusalem, it is bordered to the south by Abu Dees and by the Dead Sea to the east, and it is currently connects the south and north of the West Bank (Bethany Municipality, 2019). The estimated population is more than thirty-five thousand, but the official statistics in 2018 says that the Population Census is 21,200 (PCBS, 2019).

In general Bethany, municipality depends on two major sources of water in order to supply the whole towns of drinking water, these two sources are:

The first source is buying drinking water from the supplying point that comes from Bethany well NO.3 that follows water department of the west bank whereas the other source of supplying the town of drinking water is the Israeli company "jeahoun".

According to the official records of Bethany municipality, the total amount of water the municipality has bought and pumped it at the water network has reached a 2016 to (1168547 m3) where the proportion of a visual of buying from Bethany water NO.3 was (29%) and the proportion of a visual of buying water from the Israeli company (jeahoun) was (71%). (Bethany Municipality, 2019).

The town of Bethany suffers from high water loss rate that reached (50%) in 2016 and that rate is the highest in the west bank which followed by Jenin city where the water loss there reached (49%). (Palestinian Water Authority, 2017).

That means that the municipality of Bethany town loses every year about (50%) of sums of money that supposed it collected as the water prizes from people whom by drinking water and its surfaces from the municipality, on the other hand, high percentage of people at the town don't pay water bills and that caused high amount of debt on the municipality.

The image below shows the location of Bethany town:

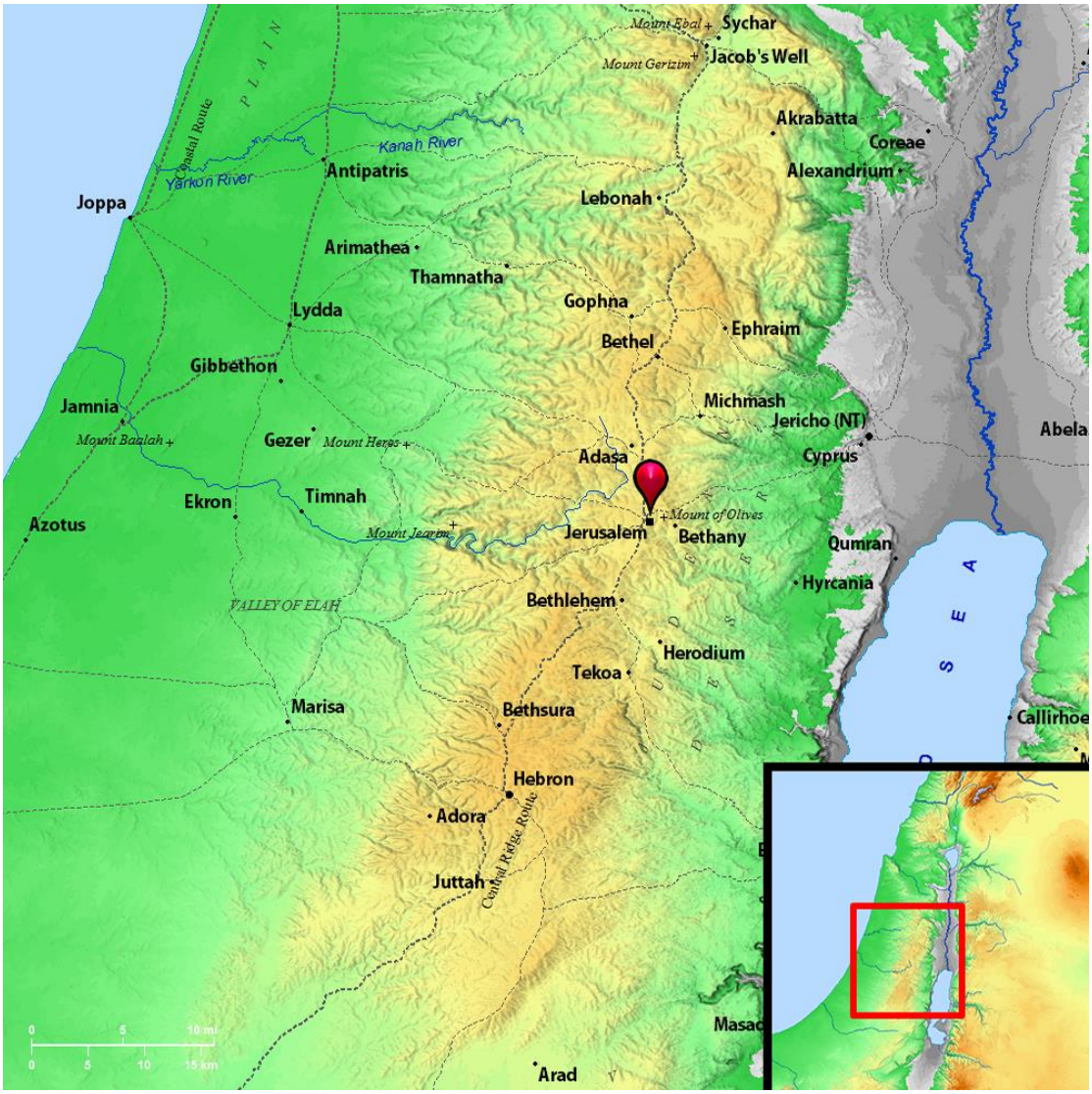


Image (1) Map of Bethany town .

### 2.8.2. Socio-economic conditions of the residents:

Similar to other Palestinian ( C ) areas, Bethany is a community where the main income sources of the residents depend on trade and employment in public institutions in addition to work in Israel in building and agriculture, the family size is less than 7 members each ( PCBS, 2019).

The area has a relatively high unemployment rate. The average unemployment rate is17.3 that mean more than 363,300 of the people are jobless (PCBS, 2019). From a water management point of view, people's affordability of water will be at a minimal level, leading to the failure of the water utility or other supply provider.

**Table (12): Some Socioeconomic Indicators in Bethany**

| Indicators | Bethany |
|---|---|
| Family size | **7.71** |
| Unemployment (%) | **17.3** |

*Resource: Palestinian Central Bureau of Statistics: 2019

In our study we will try to discover the water tariff system which is applied at Bethany Municipality and if it achieves the full cost recovery of water, efficiency, equity, and sustainability, and try to explore if People of Bethany town have awareness towards water tariff system and water problems which Bethany suffers from in general.

### 2.8.3. Water Supply in Bethany:

As mentioned above, the Municipality purchases water in bulk and distributes it to the people after adding additional costs. The water network was constructed in 1975, and its main problems are: a high percentage of water loss (42%) by the end of 2018 and low pressure (20% of the residents receive water only after midnight). In the last five years and due to rapid population growth and unplanned urban expansion, the network has been extended by more than 30%, causing more complicated water supply problems. One of the major problems is that the Municipality has no detailed plan for the network. New connections are usually done by the water unit without taking into consideration any engineering parameters (such as future connections, pressures, demand, etc.). Despite the fact that the township is willing to solve the mentioned problems, the institutional capacity, the lack of fiscal resources, the lack of strategy and visibility, the absence of government support, and social conflicts among the people are the main obstacles to overcome the problems mentioned (Bethany Municipality,2019).

### 2.8.4. C**riteria for selecting the Case Study:**

- Population size should match with the average population of the urban areas.
- Poverty rate is within the average of the national rate.
- Connected with a water network.
- Data availability and accessibility.
- High level of municipality cooperation with the researcher in particular.
- Water consumption falls with the national range.

- Access to households' water meters.

### 2.8.5. Tariff and pricing system in Bethany Municipality:

The Municipality Council is the body responsible for setting the price and tariff structure. The current pricing system is not based on any criteria (cost recovery, social fairness, environment, etc). The interviews showed a lack of transparency since the consumers have no background about the procedures and no prior notice about the increase in prices. The price and tariff structure during the study are shown in Table below:

**Table (13): the tariff structure in Bethany municipality that used during the Study Period / Domestic Use**

| Block (water consumption, $m^3$) | Price NIS | Number of consumers |
|---|---|---|
| **0-15 m3** | 5 NIS | 3084 |
| **16+ m3** | 6 NIS | 944 |

*Resource: Bethany Municipality: 2019

**Table (14): the tariff structure in Bethany municipality that used during the Study Period / Commercial Use**

| Block (water consumption, $m^3$) | Price NIS | Number of consumers |
|---|---|---|
| **0/15 m3** | 6 NIS | 311 |
| **16+ m3** | 7 NIS | 172 |

*Resource: Bethany Municipality: 2019

By referring to the previous tables, we observe that the tariff system that is used at Bethany municipality is the increasing or the inclining block rate, and that means the rate charged increase as more volumes of water are used can be implemented by establishing categories such as basic use, normal use, heavy use or excessive use.

The system has divided the tariff into two categories: domestics use and commercial use.

2.8.5.1. Domestics use: domestics relating in general to the activities normally associated with the home, whenever they actually occur, so, the domestic's use of water is relating to the use of water for the house or home services (Herath et al, 2001).

As we can see in the table (7), there are two blocks of water tariff at Bethany municipality for the domestics use, the first block is from 0m3 to 15m3 for five NIS per one cubic meter, and the second block is from 16me and more for six NIS per one cubic meter.

The number of consumers who use the first block is 3084, and as the official records at Bethany municipality, 22% of the consumers of the first block who just pay the water bills and 78% don't pay. As for the second block, there are 944 consumers, and as the official records at Bethany municipality, 16% of consumers who pay and 84% don't pay.

2.8.5.2. Commercial use: Commercial means using it in or for a business or directly/indirectly for financial gain, so, the commercial use of water is relating to the use of water for business or financial gain (Bernard, 2002).

There are two blocks of water tariff at Bethany Municipality for the commercial use, and as the domestic's water tariff the first block is from 0m3 to 15m3 but for six NIS Per one cubic meter, and the second block is from 16me and more for seven NIS Per one cubic meter.

The number of consumers who use the first block is 311 and as the official records at Bethany municipality, 34% of the first block who pay and 66% don't pay, and as for the second block, 27% who pay and 73% don't pay.

By referring to the above, we can see that the payment ratio of the consumers who reach the second block is decreasing, the reason behind that often is the accumulation of debt and high debts, where the consumer finds it difficult to pay the debts or schedule it.

## 2.9. Literature Review:

- Li-JinZhong,Arthur and P.J.Mol. (2007). Participatory environmental governance in China: Public hearings on urban water tariff setting.

This study aimed to analyze the emergence, development and current functioning of public hearings in water tariff setting and assesses to what extent public hearings are part of a turning point in China's tradition of centralized bureaucratic decision-making, towards more transparent, decentralized 5and participative governance. This thesis shows that in its urban water management reform, China has made material policy efforts in reforming water tariffs by issuing a series of policy documents and regulations. The transformation of China's water tariff setting process during the past decade is at the heart of urban water management reform. This transformation has two Dimensions: decentralization and participation.

In this thesis' literature about participation and empowering the public, charts a sliding scale from information provision through consultation, placation, partnership, delegated power to citizen control. Thus a continuum is drawn from symbolic tokenism to real power-sharing, each with different implications for citizen participation and democracy. From the experiences with price public hearings in recent years in China, as analyzed in this article, the power and influence of participants from various governmental departments, industries, organizations, and individual households go beyond mere symbolic tokenism or information reception.

- Ileana Foletti1 et al. (2011). Smoke in the (Tariff) Water.

This thesis aimed to discuss The amount of policy space that left by WTO legal tariff bindings which allows for an increase in MFN tariffs similar to what we observed during the Great Depression and this after controlling for the smoke in the tariff water, i.e. bindings above prohibitive levels (that we call water vapor) and widespread regional trade agreements (that we call dammed water). When looking at recent economic crises, it appears that this large policy space has been used only moderately by countries facing economic crisis. Large countries tend to increase their tariffs more than small countries when facing a crisis. Countries tend to increase their MFN applied tariffs also when neighboring countries face a crisis. However, this tendency is limited if the crisis also affects the country itself. Increases in intermediate goods' tariffs tend to be smaller than

increases in final goods' tariffs as one would expect in a world with a growing share of trade in intermediate goods. Nevertheless, the overall increase in MFN tariffs remains modest, suggesting that all these running water did not help float strong protectionist forces during the past economic crisis.

- Junguo Liu et al. (2002). Water as an economic good and water tariff design Comparison between IBT-con and IRT-cap.

This paper is intended to critically examine the use of IBT-con and to strongly promote a new tariff structure, IRT-cap. The case study of Weinan City shows that IRT-cap is an effective tariff to achieve the objectives of equity, simplicity, transparency and implement as well. Also, IRT-cap seems easier to achieve cost recovery than the traditional IBT-con taking the ability to pay of water consumers into account. Pilot projects are necessary to be formulated for verification of this new tariff.

- Telford. (2004). Engineering - Civil Engineering Environmental Sciences - Environmental Fluid Dynamics Earth Sciences – Hydrology.

This study aimed to clarify that the Water Management publishes papers on all aspects of water treatment, water supply, river, wetland and catchment management, inland waterways and urban regeneration. Coverage includes the traditional areas of applied fluid dynamics and water (including supply, treatment, and sewerage) and river engineering; together with the increasingly important fields of wetland and catchment management, groundwater and contaminated land, waterfront development and urban regeneration. The scope also covers hydro informatics tools, risk and uncertainty methods, as well as environmental, social and economic issues relating to sustainable development.

- Sam Kayaga and Ian Smout. (2003). Tariff structures and incentives for water demand management.

This study aimed to review how urban water tariff structures could be designed to promote water conservation in households while also ensuring revenue sufficiency for the service providers and affordability for low-income households. As an example, the paper describes the case of Zaragoza (Spain), a city where the implementation of a water-

conserving tariff and providing economic incentives largely contributed to a 27% reduction in overall water consumption between 1996 and 2008, although the population of the city increased by 12%. Similar principles were adapted to model a water-saving, socially equitable tariff for the city of Kampala (Uganda). The proposed tariff for Kampala can save over 2·5 million $m^3$ of water and generate an extra US$ 0·68 million of revenue per year, which could be used to extend water services to currently unnerved households in low-income settlements. If implemented, the tariff could enhance economic efficiency, revenue sufficiency, social equity, and service coverage.

- Grafton*and Kompas ( 2015 ) Optimal water tariffs and supply augmentation for cost-of-service regulated water utilities.

This study aimed to describe how a common method for regulating water utilities, cost-of-service regulation, can both in theory and practice result in the premature and economically inefficient water supply augmentation. Using a dynamic model calibrated to demand and supply conditions in Sydney, Australia we show how to optimally determine the time to supply augment using a 'golden rule' that minimizes the average volumetric price paid by consumers. Our results show that the greater the water scarcity and the longer the operational life of the additional supply, the sooner is the optimal time to augment. Based on our findings, we recommend that price regulators of water utilities adopt a historical cost less depreciation basis for a regulated asset base and a fully flexible and dynamically efficient volumetric pricing that accounts for the marginal opportunity cost of water supplies.

- Boland and Whittington (1997) Water tariff designed in developing countries: disadvantages of increasing block tariff (IBTS) and advantages of uniform price with rebate (UPR) designs.

In this research the authors tried to improve that the uniform price with rebate (UPR) designs is better than the increasing block tariff (IBTS), the objective of this paper is to critically examine the current fashion of using IBTs in developing countries. Discussion of the objectives and related considerations governing utility tariff design reveals that cross-subsidies are undertaken in the interest of a subjective view of fairness, not equity and that some cross-subsidies have negative impacts on the presumed beneficiaries.

- le Blanc (2008). a framework for analyzing tariffs and subsidies in water provision to urban households in developing countries.

The paper aims to present a basic conceptual framework for understanding the main practical issues and challenges relating to tariff s and subsidies in the water sector in developing countries, and it presents an analytical framework for assessing the need for and evaluating subsidies and discusses the recent evidence on the features and performance ofWater tariff s and subsidies in various regions, with a special focus on Africa. The researcher recommends at the end to pay higher prices for improved services, thus potentially alleviating the burden on the utilities (and government) budget; and policies should be focused on increasing access to improved drinking water, rather than subsidizing the consumption of tapped water provided by public utilities.

- Salama (2014) the conflict over water in Palestine,Journal of Palestinian Affairs, edition 257.

This study is about the importance of water in development, and it focused on the issue of Palestinian water rights within the Israeli Palestinian conflict, and under the Israeli domination of water resources, the study also analyzed the dimensions of the water crisis in Palestine and the interim agreements in addition to the Israeli official statement.The study concluded that the searching about alternatives doesn't cancel the right of Palestinians of using the whole resources.

- Al-Husain (2013) Water justice from the perspective of international law.

This study aimed to recognize the concept of water justice and it searched about the importance of do not make the water sector under supply and demand mechanisms, and recognize the water as a basic element to survive. And the study concluded to depend on rules that maximize the benefits of equity and sustainability and overcoming Obstacles depending on common responsibility ruleAnd providing rational water resources and common and effective political will to prevent the water crises and conflict.

- Jabber (2006) Water Tariff in Gaza stripmunicipalities, Critical study.

This study aimed to recognize the difference between the water tariff and water price in addition to recognizing the importance of the privet sector in managing the facilities, and

showing the goals of tariff policies, and evaluating the water tariff that applied in Gaza strip municipalities and the importance of creating a uniform system for the water tariff.

The study found that there are 16 water tariff applied in Gaza strip municipalities in spite of similarity of the social and economic circumstances of Gaza strip citizens, the study also clarified the most important scientific basics that we should follow when we try to create a new water tariff or change it, in addition to that he says that the current water tariff doesn't consider the social dimension and the variation in the income levels of the consumers.

The study dependedon the descriptive analysis approach which based on collecting information and data by means of questionnaires that distributed to the targeted municipalities, and the study was conducted on 16 municipalities in Gaza strip which their services cover about 80% of Gaza citizens.

- Al-Tamimi's ( 2009) integrity and transparency environment in the Palestinian water sector.

This study aimed to fight against corruption in the water sector and pointing to the absence of the rational management and diminution of the quality of governance in the public associations and foxing on the anti-corruption measures and the environment that generates corruption and factors that encourage it.

The results of the study were that there is no application of laws and regulations relating to the water sector and that the administrative Instructions and water policies are incomplete, and the lack of clarity in using drinking water and agriculture, in addition to the censorship on the water sector whether from the Water Council, the Cabinet, the Ministry of Finance, the Audit Bureau and the Legislative Council, and that leaded to the loss of direct charge. However, the recommendation of the study, first the searcher recommended to the need to review all laws related to water and issuing systems that determine powers of each Party, and activate the water authority as an organizer party and not executive, and activate the Water Council creating technical committees in addition, to activate the role of censorship and approving the manual report of the water report from the Parliament and Periodic Review to the lecturer of the Joint Water Committee

and reconsidering in the rules of procedure of the water authority and he added that the water authority should follow the prime minister directly and that there should be accountability at the parliament.

- Salem (2014) the system of water tariff from the perspective of social justice, Water Authority of Ramallah and Al – Bireh.

This study aimed to recognize the extent of social justice (progressive block water tariff, the equity of prices for all regions, and the relevance to the citizen's incomes) which should be achieved by the water tariff system which applied in the water authority in Ramallah and Albiereh, in addition to that the study foxed on the importance of creating policies that related to the demand's management, also supporting and protecting poor and marginalized people, and fair administration in water distribution for all consumers.

**2.10. Knowledge gap and revision of the previous studies:**

We can see in the previous studies that most of them show issues that related to water tariff from the side of the effects that related to the ability of cost recovery, and about the local studies talk and focus on the variation between Palestinian regions, and the social inequity. In addition to the problems in the legislative, and executive water Palestinian associations, which are similar to what we do in our study. While, this study is different because we mentioned all factors that affect the water tariff and we should take it in consideration when we create and design water tariff in order to mind the gap between social justice and cost recovery and achieve equity and efficiency.

If we followed the goals of global studies, in general, it aimed to discuss the water as an economic good, and the types or stricture of water tariff, and the compatibility with the types or the structures of water tariff and economic and social circumstances and how to achieve equity and efficiency.

**2.11. The distinction between this study and other studies?**

As for our study, it aimed to activate the role of water tariff, and that was through showing up the water tariff policies goals and putting the scientific basis to design the structure of the water tariff.

This study has evaluated the water tariff that is applied in Bethany municipality, and know how the variables of our study affected the water tariff, and if the municipality

takes into account these elements when they have designed the model of water tariff that they apply.

In addition to that, the study tried to explore if the model of water tariff which is applied in the Bethany Municipality can achieve a higher level of higher equity and efficiency with taking into consideration the cost recovery.

So far, what our study has touched on and how it analyzes the real cost of water tariff and the factors that have an effect on calculation, has not mentioned in the local studies in this specific way.

**2.12. Hallmarks of the current study:**

This study discussed the water tariff system, which is applied at Bethany Municipality and tried to discover if the official of the water sector at the municipality has taken in consideration scientific bases when they create and design the model.

as a matter of fact, it supposed that the designers of water tariff at the municipality wants to achieve these three main goals: ( 1 ) social justice, ( 2 ) economic efficiency and ( 3 ) full cost recovery, and to know if the water tariff system at the municipality has achieved these three main goals the study put up these variables:

1. People awareness towards water tariff and other water issues that affect water tariff such as technical efficiency and water losses, the study will show up how this factor ( people awareness ) have an effect on the water tariff which is applied at Bethany municipality.
2. The study will show up if there is a proper and applicable water tariff system in Bethany, and that will be examined through measuring if the experts at Bethany municipality have taken these factors in consideration when they designed the current water tariff: multiple water sources, technical efficiency, energy use, water losses.

## Chapter Three

## Methodological framework

### 3.1. Introduction

### 3.2. Research Purpose: Exploratory/Descriptive/Explanatory:

### 3.3. Research Methodology:

### 3.4. Research Approach:

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### 3.9. Data Collection Process:

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### 3.11. Sample Features and Statistical Treatment

# Chapter Three

## Methodological framework

### 3.1. Introduction

This chapter presents the methodology of the research process to achieve research goals. It will introduce the approach that will be used to analyze the collected data from the respondents who are the sample of this research. The chapter explains in detail the methodology used in gathering the information necessary for this study. It highlights the sources of data and the survey design, which includes the sampling plan and the data analysis method employed. The steps involved are elaborated in details and have been carried out systematically in order to achieve a high degree of reliability and validity.

The term methodology is a system of explicit rules and procedures in which the research is based and is against, which claims of knowledge are evaluated (Kothari, 2004).The methodology used in this study is integral to the reliability of the findings and the validity of the study. Therefore, this section focuses on the research technique adopted and used for this study with the aim of achieving the research objectives. It also contains a description of the instruments used to measure various constructs applicable to this study.

This study aimed to show up the role of water tariff and that was through reflecting the water tariff policies goals, moreover to show up the scientific basis to design the structure of water tariff. With taking into consideration equity, efficiency, and cost recovery. However, the researcher will take Bethany municipality as an evidence.

To achieve that the study will therefore address a description of themethodology, the population of the study and the method, which used to choose the sample of the study, as well the study will describe the tool that used and the procedures that used in implementation. In addition to that, the steps that needed to verify the authenticity and stability of the tool in addition to the statistical treatments that used to analyze the results.

### 3.2. Research Purpose:

This study is an exploratory research study, in order to explore the influenced factors of the water tariff (Phenomenon) as it is existed in Bethany ,in addition the study describes the factors from the perspectives of both municipality and community members. For this research both primary and secondary data are required; the primary data is the theoretical data, and the secondary data will be collected from the research instruments and tools.

### 3.3. Research Methodology:

The research depend on descriptive analysis approach that based on collecting information and data about the subject of the study. Throughout, the qualitative and quantitative methods that used to strengthen the outcomes of the study, in which the qualitative approach is the main method and the quantitative method is the supportive method, toward proving the answers from both sides of water tariff service in Bethany city. The methods used in order to describe the water tariff factors and consequences for both municipality and community, and to analyze the perspectives of both parties regarding to deliver a new approach of water tariff that might be convenient with both parties (Municipality and community).

The gathering information tools used are: first, interview with experts and heads of water departments in the town of Bethany, which the interview has been conducted with 9 experts and heads of municipality departments regarding the water service tariff. Second, questionnaire that has been distributed over 87 families in Bethany, who are using water parameters depending on statistics and disclosures obtained from the municipality about the numbers of water parameters exist in Bethany city, which are 5000 water parameter (see appendix # 3). It is worth to mention, that the researcher distributed 120 questionnaires for the use of head of families, and 87 questionnaires returned proper to be analyzed statically.

### 3.4. Research Approach:

The research approach is deductive when the theory and hypothesis are developed and a research strategy is designed to test the hypothesis, or it can be inductive when the data is collected and theory is developed as a result of data analysis. The deductive approach owes more to positivism and the inductive approach owes more to phenomenology (Saunders and others, 2009).

In this study research questions are developed. Research strategies are designed and research questions are answered accordingly. Therefore, it can be concluded that the research approach is deductive.

Based on the study of Guba and Lincoln (1994), there are two approaches or methods of research i.e. Quantitative and Qualitative that are available to researchers. The most important difference between the two approaches is the use of numbers and statistics. The choice of research approach naturally depends on the defined research problems and the data needed for solving these problems.

**The qualitative approach** emphasizes on processes and meanings that are not measured in terms of quantity, amount, intensity or frequency. The qualitative approach provides a deeper understanding of the phenomenon within context (Guba and Lincoln, 1994). Moreover, qualitative researchers stress on the socially constructed nature of reality that states the relationship between the researcher and the phenomenon under investigation.

On the other hand, **quantitative researchers** emphasize the measurement and analysis of casual relationships between variables. According to Cochran and Dolan (1984) there are differences between qualitative and quantitative research that relate to the distinction between exploratory (qualitative) and confirmatory (quantitative) analysis. When there is little theoretical support for a phenomenon, it may be impossible to develop precise hypotheses, research questions, or operational definitions. In such cases, qualitative research is appropriate because it can be more exploratory in nature (Sullivan, 2001; Cited by Darabi et al.)

Qualitative research involves conducting interviews during the explanatory stage of a research project with the aim of uncovering factors that play a role in the marketing problem. The interviews should aim at uncovering new qualitative information rather than gathering quantifiable results. As a result, exploratory interviews are open – ended so as to stimulate respondents to share their thoughts and feelings. (Miles &Huberman, 1994)

According to Gabriel (1990), qualitative research can be used to probe deeply into consumer's underlying needs, perceptions, preferences and level of satisfaction. In addition, such research can be used to gain greater familiarity with and understanding of construction problems whose causes are unknown. Furthermore, ideas can be developed that can be further investigated through quantitative research.

According to Malhotra and Birks (2003), quantitative research is suitable for measuring both attitudes and behavior. Quantitative research can be used to create models that predict whether someone holds a particular opinion or would act in a certain way based on an observable characteristic. Quantitative research techniques search for quantify data by applying some form of statistical analysis.

After comparing two research approaches in this study, both quantitative and qualitative approach have been chosen. Therefore, this study will use the mixed approach (both quantitative and qualitative) in order to collect data from both sides of water tariff set: the municipality and the community. Gathered data will be analyzed and measured through the respondents answers.

The purpose of this research requires using two types of methods. These are quantitative and qualitative methods. This mixed method used in order to collect and analyze the data gathered from the sample of the research population. As well as towards examining and answering the questions of the research statistically, that needs to design a quantitative tool for collecting the data, which contains a number of axes to cover the aspects of the research, (Gardner, 1996). In addition to the quantitative tool, there is a qualitative tool for gathering the data. This tool is the structured interview in order to know the perspectives of the official parties and unions regarding the subject of the research.

### 3.5. The population and sample of the study:

As mentioned above, there are two methods – qualitative and quantitative- that used into this study, where the population and the sample of each method is as following:

1- Population of the qualitative method as shown in the table below, represents in all households, who are in charge of following up with the water service in Bethany town. Whereas, the sample of this population is 9 interviewees who are experts and persons who are in charge of the water delivery and tariff services.
2- The population of the quantitative method as shown in the table below, represents in 4600 water parameters used by households and community of Bethany town, based on disclosures obtained from the municipality. Where the sample of this population represented in questionnaire tool (Community), in which the researcher distributed over 87 families.

The sample has been selected through systemized random sample, by accounting randomly at number 50 from each disclosure, which means 25 families from 1000 families to be the sample of the study.

**Table (15): populations and samples of the study**

| Population | Sample | Sample size |
|---|---|---|
| **persons who are in charge of following up with the water service in Bethany** | experts and persons who are in charge of the water delivery and tariff services. | 9 interviewees |
| **4600 water parameters used by families and community of Bethany town** | families which has been selected through systemized random sample | 87 households |

### 3.6. Research Methodology Flow Chart:

The following Chart shows the methodology of the study :

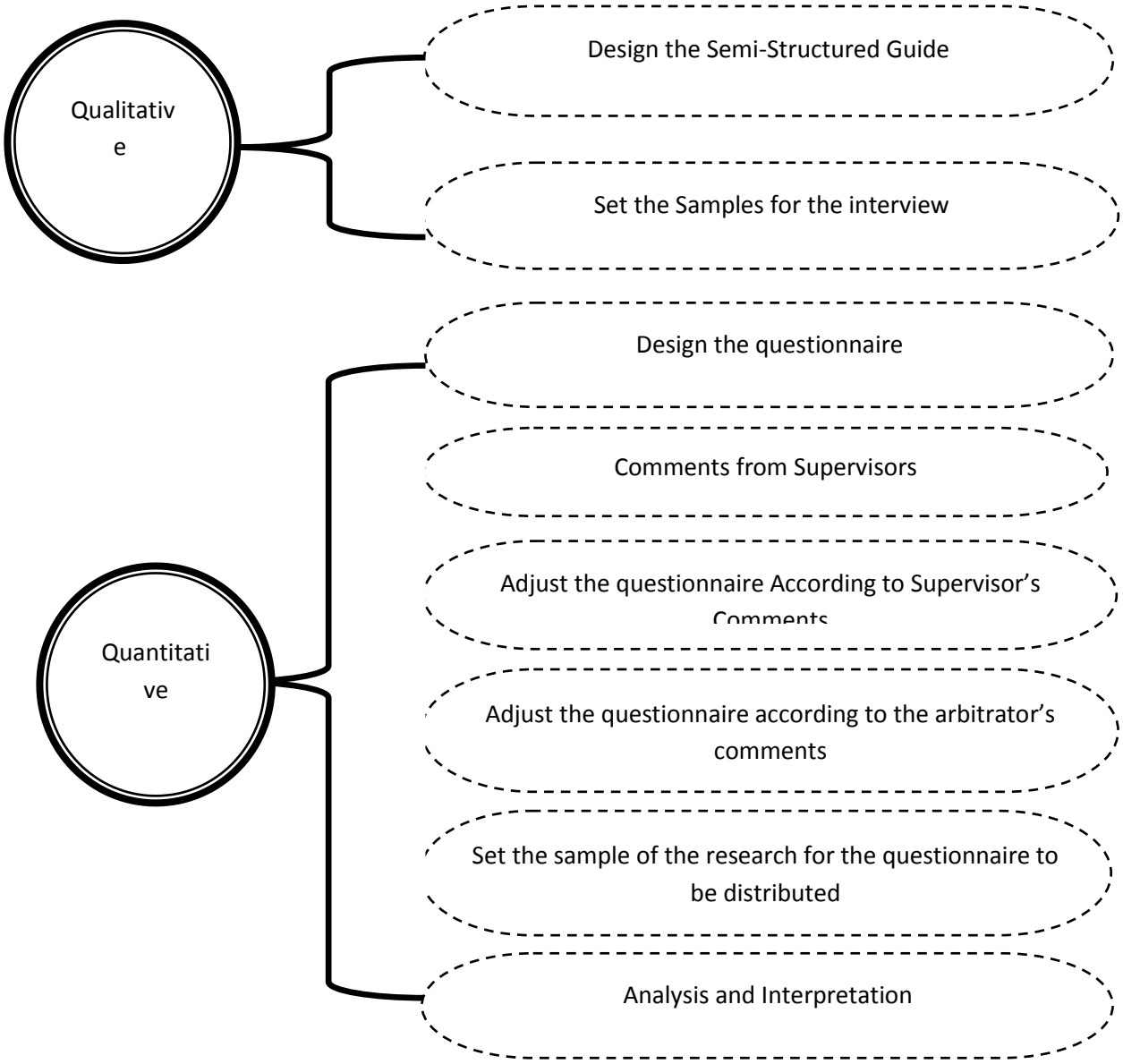


Figure (2): Research Methodology

### 3.7. Model of the study:

This chart shows the model of the study, as shown in the fig, the Independent variables are: multiple water sources, technical efficiency, water losses, energy use and households awareness towards the current water tariff system which is applied at the Bethany Municipality,technical efficiency and water losses and dependent variable is the water tariff at Bethany municipality.

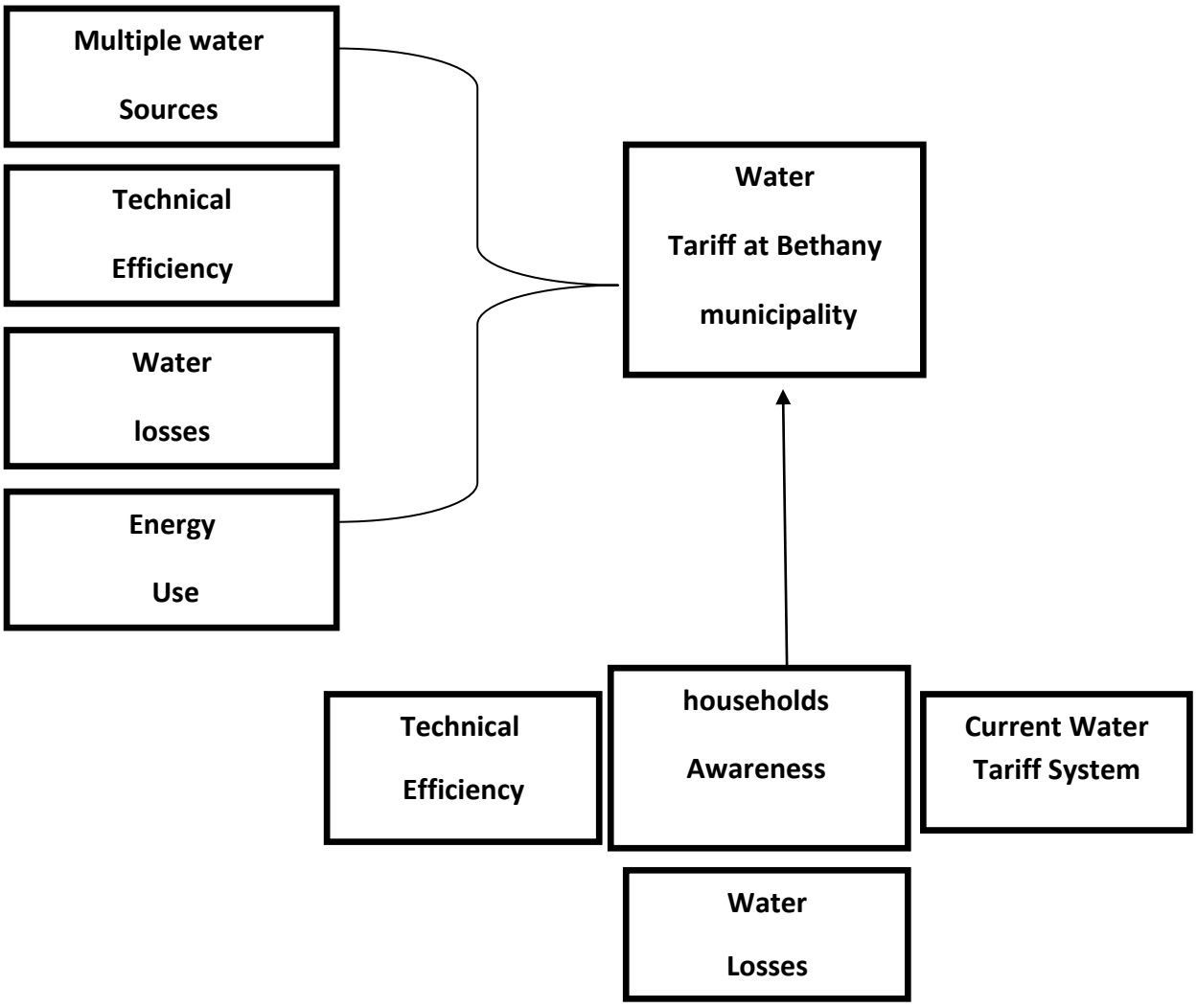


Figure (3): the model of the study.

### 3.8. Description of the study variables:

3.8.1. Energy use: the researcher means by this the type of energy that use in briging and producing the drinking water for the cosumers, and that includes the energy that use for the atisian well pumps and if there are any other pumps within the water network needs energy to work.

3.8.2. Technical effeciancy: the researcher means by this variable the efficiancy of the phesical equipments that use to produce the water and how does that has an effect on water tariff system, in addition to expenses that the municipality needs to cover all staff related to producing water.

3.8.3. Water losses: the researcher means by this variable the quantities of water that aren't calculated within the total cost of the drinking water that the municipality pumps it through the network, where is the total quantity of water which is sold to the customer according to the bills is less than the quantities which are pumped through the water network, and that maybe have an effect on caculating the water tariff, and that includes: technical losses and commercial losses.

3.8.4. Households awarness: the researcher means by this variable the awareness of households who should have an idea about water tariff system and other factors that have effect on it such as: technical efficiency and water loses, which belongs to water consumption and utilization, because of its role in reducing the water consumption then reduce its cost.

### 3.9. Data Collection Process:

Two types of methods that used in this study. The first one is a questionnaire designed by the researcher after reviewing the literatures related to the subject of this study. This questionnaire distributed onto the sample from community members who are families heads, as mentioned in table # 1) the sample characteristics. It will be analyzed statistically (Quantitatively) using the SPSS software, in order to show the correlations between the variables and the equations used in the analytical process in addition to the results of the analyzing process. The questionnaire has been distributed by hand for the sample individuals of the study, in order to verify the receiving of the questionnaire for the individuals. (see appendix # 2)

The second method is the semi-structured interviews, which have been conducted with nine formal experts and persons in charge of water tariff and service. Those are considered the main sample of the water services and tariff. This interview will be analyzed qualitatively based on the answers that come out from the respondents. (see appendix # 1)

### 3.10. Data Analysis

This section talks about the data analysis approach, for both qualitative and quantitative data.

#### 3.10.1. Qualitative Data Analysis

**Transcription:**

Almost all qualitative research studies involve some degree of transcription – the data may be tape recorded interviews, focus groups, video recordings, or handwritten field notes. It is usually inappropriate to write up summary notes from a tape recording – unless the words are transcribed verbatim. The researcher is likely to bias the transcription by only including those sections that seem relevant or interesting to them. Many researchers who include some non-verbal cues in the transcript - silence may communicate embarrassment or emotional distress, or simply a pause for thought. Words such as "well…., I suppose ….", are important elements of a conversation and should not be ignored. Laughter or gestures may also give added meaning to the spoken word. If someone else is transcribing your material, it is important to tell them how much of this non-verbal matter to include. If you have never transcribed material, it is a useful exercise to do a little yourself. (Flick, 2013)

**Organizing the Data:**

After transcription, it is necessary to organize the raw data into easily retrievable sections. The researcher may give each interview a number or code, or break up field notes into sections identified by date or by context. Interviewees will need to be given pseudonyms or referred to by a code number. A secure file will be needed that links pseudonyms and code numbers to the original informants, but as with any research this file is confidential and would usually be destroyed after completion of the project. Similarly, names and

other identifiable material should be removed from the transcripts. Narrative data need to be numbered using line or paragraph numbers, so that any unit of text you use can be traced back to its original context. (Flick, 2013)

The best way to organize the data is to go back to the interview guide. Identify and differentiate between the questions/topics that the researcher is trying to answer, and those that were simply included in the interview guide as important, but for the moment, not essential. Data should be organized in a way that is easy to look at, and that allows the researcher to go through each topic to pick out concepts and themes. One way to do this is to organize all the data from the interview transcript. (Lacey and Luff, 2007)

**Familiarization**

The above procedures will have begun the process of familiarization. This means that the researcher listening to tapes and watching video material, reading and re-reading the data, making memos and summaries before the formal analysis begins. This is an essential stage, and is particularly important if the main researcher has not gathered all the data themselves. (Flick, 2013)

Each of the response categories has one or more associated themes that give a deeper meaning to the data. Different categories can collapse under one main over-arching theme. (Lacey and Luff, 2007)

**Coding**

Coding is the process of combing the data for themes, ideas and categories, and then marking similar passages of text with a code label so that they can easily be retrieved at a later stage for further comparison and analysis (Kawulich, 2004). Coding the data makes it easier to search the data, to make comparisons and to identify any patterns that require further investigation. Codes can be based on: (Flick, 2013)

- Themes, Topics
- Ideas, Concepts
- Terms, Phrases
- Keywordsfound in the data.

Usually passages of a text that are coded but they can be sections of an audio or video recording or parts of images. All passages and chunks that are coded the same way – that

is given the same label – have been judged (by the researcher) to be about the same topic, theme and concept. (Kuwalich, 2004)

The codes are given meaningful names that give an indication of the idea or concept that underpins the theme or category. Any parts of the data that relate to a code topic are coded with the appropriate label. This process of coding (associating labels with the text, images etc.) involves close reading of the text (or close inspection of the video or images). If a theme is identified from the data that does not quite fit the codes already existing, then a new code is created. (Flick, 2013)

In this study, a thematic data analysis will be used in order to analyze the qualitative data from the semi-structured interview that has been conducted with nine experts and persons in charge of water tariff. (see appendix # 5)

### 3.10.2 Quantitative Data Analysis

Schneider (2005) has stated the steps of analyzing the quantitative data gathered for the research requirements, as following:

**Prepare the data:** Data must be clear and organized for analysis.

**Describing the sample:** To put the data in context, describe them in terms of averages (e.g. average height) and variation (e.g. the range of heights).

**Explore the differences between data:** This means assessing whether the differences among the same variable in two different groups are statistically relevant. For example, you if you find out that the values of the averages of a given variable are different in two groups (e.g. study group and control group), can you say that there is *really* a difference among the two groups or could this difference have risen by chance?

**Explore the relationships within data (among pairs of variables):** You must understand what relations exist among different variables in your dataset and establish if they are statistically significant, particularly between measures of programed operations and measures of expected effects.

**Organize and present the data:** data and findings must be inserted into tables with title for each table, and discussed and explained what each table contains. This is the presentation of the results of the analysis.

This study will follow the above mentioned steps for both quantitative and qualitative tools, after data collection process.

### 3.11. Sample Features and Statistical Treatment

Regarding the quantitative analysis, the sample features came as table # 1 shows:

**Table # (16): Sample features of the quantitative method**

| Variables | Number | Valid percent | System missing |
|---|---|---|---|
| **Household head** | | | |
| Yes | 66 | 84.6 | - |
| No | 12 | 15.4 | |
| **Size of Family** | | | |
| 1-4 | 24 | 32.0 | 3 |
| 5-7 | 42 | 56.0 | |
| More than 7 | 9 | 12.0 | |
| **Education Level** | | | |
| Tawjihi | 24 | 30.8 | |
| Tawjihi/Diploma | 31 | 39.7 | - |
| BA | 15 | 19.2 | |
| More than BA | 8 | 10.3 | |
| **Do you Have a work recently** | | | |
| Yes | 65 | 83.3 | - |
| No | 13 | 16.7 | |
| **Type of work** | | | |
| Governmental | 15 | 22.1 | 10 |
| Non-Governmental | 19 | 27.9 | |
| Self-employed | 34 | 50.0 | |
| **Monthly Income** | | | |
| 1425-2500 | 33 | 46.5 | |
| 2501-3500 | 17 | 23.9 | 7 |
| 3501-4500 | 9 | 12.7 | |
| 4501-5500 | 4 | 5.6 | |
| 5501 and more | 8 | 11.3 | |
| **Do you use Water parameter privately or shared one** | | | |
| Private | 40 | 51.9 | 1 |
| Shared | 37 | 48.1 | |
| **Are you committed with paying the monthly water invoice** | | | |
| Yes | 42 | 54.5 | 1 |
| No | 19 | 24.7 | |

| | | | |
|---|---|---|---|
| Usually | 16 | 20.8 | |
| **Do you use electric pumper?** | | | |
| Yes | 33 | 42.9 | 1 |
| No | 44 | 57.1 | |

**The validity of the instrument:**

The researcher verify the validity of instrument by presenting it to group of judges and their comments and suggestions were taken into consideration to produce the questionnaire. So, the study about the level of the activation of water tariff and explore the effects of the Tariff in Bethany town.

**Table # (17): Results of Person correlation Matrix paragraphs study tool correlation with the total score of the instrument**

| N | Person correlation | Sig | N | Person correlation | Sig |
|---|---|---|---|---|---|
| 1 | 0.421 | 0.000 | 10 | 0.575 | 0.000 |
| 2 | 0.566 | 0.000 | 11 | 0.371 | 0.001 |
| 3 | 0.287 | 0.011 | 12 | 0.363 | 0.001 |
| 4 | 0.595 | 0.000 | 13 | 0.513 | 0.000 |
| 5 | 0.091 | 0.426 | 14 | 0.347 | 0.002 |
| 6 | 0.520 | 0.000 | 15 | 0.234 | 0.039 |
| 7 | 0.494 | 0.000 | 16 | 0.646 | 0.000 |
| 8 | 0.510 | 0.000 | 17 | 0.441 | 0.000 |
| 9 | 0.540 | 0.000 | 18 | 0.476 | 0.000 |

The results indicated that all of paragraphs correlation values with total degree of the instrument are statistically significant, indicating that the internal consistency of the paragraphs of the tool and they share together in the measurement of the level of the activation of water tariff and explore the effects of the Tariff in Bethany city.

**The Reliability of the Instrument:**

The reliability calculation in a way internal consistency and calculates (Cronbach Alpha), as it clear from table number (3):

**Table # (18): results of (Cronbach Alpha test):**

| | number of cases | number of items | Cronbach Alpha |
|---|---|---|---|
| people awareness of the water tariff | 78 | 8 | 0.63 |
| Consumer Awareness Measuring about Water losses rate | 78 | 5 | 0.55 |
| Technical Staff efficiency | 78 | 5 | 0.66 |
| Total degree | 78 | 18 | 0.73 |

Reliability has been verified tool study examined the internal consistency of the paragraphs of the tool calculates the Cronbach alpha coefficient (Cronbach Alpha) on the total study sample as the value of consistency (0.73).Thus the tool has a good degree of consistency

**Statistical treatment:**

After collecting the study data, the researcher reviewed it in preparation to be entered to the computer. It have been inserted to the computer by giving specific figures, which means to transfer the answer from verbal to digital, where the answer yes were given 3 degrees, I don't know 2 degrees, and no were given one degree. So the higher degree is the higher level of the "activation of water tariff and explore the effects of the Tariff in Bethany city". The data has been statistically processed, by extraction the numbers, the percentages, the averages, and the standard deviations. The hypotheses have been examined at the level of $\alpha = 0.05$, by the following statistical tests: T-test, (One Way Analysis Of Variance, (Pearson Correlation), (Cronbach Alpha), By using the computer with statistical packages for Social Sciences (Spss).

**Means Scale**

| | |
|---|---|
| **1-1.66** | **Low** |
| **1.67-2.33** | Middle |
| **2.34-3** | High |

## Chapter Four

## Results of the study

### 4.1 Introduction

### 4.2 Section # 1: Interview data results (main tool)

### 4.3 Section #2: Questionnaire data results (Supportive tool)

### 4.4 Discussion of the results:

# Chapter Four

## Results of the study

### 4.1 Introduction

This chapter is about an extraction of the whole study work, in which it consists of presenting the qualitative results appeared from the interview data, and the quantitative results came from the statistical analysis of the questionnaire. However, those both tools of gathering information from the sample of the study. In addition, this chapter includes the results discussion and differences between both methods results and with previous studies. Herein, the presentation of the results came from both tools and methods, divided into two section as following.

### 4.2 Section # 1: Interview data results (main tool)

In this section, the researcher has come through all nine interviews and made codes for the most important relevant answers. Afterward, the researcher has developed five categories for five groups of answers to presented as the results of the qualitative method used in this study.

Regarding, the results of the qualitative method of this study came as following:

**Category #1: the water resources of Bethany City**

There are two main resources of water that feeding the Bethany city with water, which are: JEHON Israeli Company and the Bethany's well. In which, some of the interviewees specified the number of cubes from each resource, as: 2100 cube meter per day from JEHON Israeli Company, and 1200 cube meter per day from the well of Bethany No.3. Regarding the cost of the one cube meter production of water from both resources, the head of water department at the municipality of Bethany, said that the cost of each cube meter from Bethany well is 2.60 NIS, whereas, the cost of JEHON Israeli Company is 3.10 NIS.

Comparing with literatures and theoretical framework mentioned, the municipality sells the cube meter for people for domestics use with 5 NIS price, in which they sell water for community with a loss toward the municipality whereas producing on cubic meter costs about 6.80 NIS.

In addition, regarding this category, there was a question that has been asked to interviewees which is " do you believe that unifying the water tariff with water resources diversity affects the economic effectiveness of the water service?". After reviewing the answers, we can say that there are a consensus between interviewees toward saying yes. They justify their answers that there are two resources of water in the city with different costs, if the tariff will be unified the municipality will be forced to tolerate much costs rather than its already loss toward selling and distributing water.

**Category #2: the used energy**

The most familiar energy used into producing the water from both resources is electricity, which is bought form the Israeli side and costs expensive. All interviewees said that the used energy is the electricity provided by Israel, and the municipality pay for it. For this regard, the interviewees said that this type of energy is too expensive comparing with other energy resources, which plays important role into calculating the water tariff.

Whenever, interviewee said that the cost of electricity has taken into consideration when municipality calculating the water tariff. So, why they do not looking for another type of energy to use that might be less expensive?. I wonder if they can use another type of energy like solar cells to produce their own energy rather than buying and paying for it. In this regard, I can say from the answers that the energy type playing very important role into calculating the water tariff, where they could change this and reduce the cost of distributing water among Bethany city.

**Category #3: Technical efficiency**

Regarding this category, all interviewees have answered that the technology used toward pumping the water from Bethany's well is modern technology. But, the assistant pumpers and equipment are old, which leads to the shortage of water for the comprehensive network. This causes from the old technology used into distributing the water among the

network, which also affect the rate of water losses, because the old equipment might be not convenient for the use of distributing water.

This leads to shortage of water quantities delivered to the community members, which leads them to buy moveable tanks toward providing themselves with water. However, this costs them too much comparing with buying the water from the municipality. However, all interviewees has a consensus over the cost reduction occurrence when the municipality use more developed technology regarding water production, in addition to the change of energy source.

**Category #4: water tariff system**

This category contains number of results, as 84 % from the interviewees said that when water tariff set up for community in Bethany city, the salaries of technical staff and administrative employees taken into consideration to be calculated from the amount obtained from the water service money collection. When, 50% said that the running cost of the municipality, taken into consideration when the water tariff set up.

In addition, the value added tax is calculated whenever the municipality set up the water tariff, in which 68% from the interviewees said that. Whereas, 60% of the interviewees said that the expenses of frequent maintenance regarding the water network, has taken into consideration whenever the water tariff is settled up. However, 90% of the interviewees declared that the water waste rate doesn't take into consideration when the water tariff is calculated. Which means that the water waste rate will be paid by municipality, and some of the interviewees said that there is a high rate of water waste into Bethany city.

**Category #5: rate of water losses**

Regarding this category there are different results and answers explored by the interview, in which 85% of the interviewees said that the water waste rate affects the proper calculation of the water tariff. Whereas, 15% of the sample said it doesn't affect. Both answers have justification provided by the interviewees, for the influence of the waste rate on the proper calculation of tariff they said that a part (rate) of waste water calculates and distributed over the people, which means that people in Bethany city share a part of water waste cost with the municipality. Whereas, other interviewees said that there is no effect of the waste rate on the calculation of tariff, they return that to the equity scale of setting up the tariff.

Beside, this loss of the municipality from the waste of the water, it doesn't raising up the amount of the tariff in order to cover its loss from the water waste. One interviewee who accept this issue, and said it is right but this affects the money come from the financial ministry of Palestine toward development projects, that means the development fund goes to cover the water waste loss, which leads to reduce the development issues in the city of Bethany, in order to cover the loss of waste water.

In this regard, the interviewees have a consensus of the high rate of water waste in Bethany, which approximately stated as 12% is the rate of technical water waste, whereas, the commercial water waste reaches about 40% from the whole quantity of daily water. However, it could be obvious that very high rates of water become waste without no use and the city should pay for.

### 4.3 Section #2: Questionnaire data results (Supportive tool)

This section includes a complete presentation of the most important findings of the study, and so to answer its questions, and validating hypotheses, using appropriate statistical techniques.

#### 4.3.1 First: Answers of the study questions:

**The first question: To what extent the level of the activation of water tariff and explore the effects of the Tariff in Bethany town?**

To answer this question I have analyzed the numbers, means and the standard deviations of the questions to find the level of the activation of water tariff and explore the effects of the Tariff in Bethany townon total score of the scale, as it clear from table number (19).

**Table # (19): means and standard deviations of the level of the activation of water tariff and explore the effects of the Tariff in Bethany city**

| | Number | Means | Standard Deviations |
|---|---|---|---|
| People awareness of the water tariff | 78 | 2.39 | 0.40 |
| Consumer Awareness Measuring about Water losses rate | 78 | 2.60 | 0.39 |
| Technical Staff efficiency | 78 | 2.42 | 0.49 |
| Total degree | 78 | 2.46 | 0.31 |

As shown from the previous table, which the degree of the level of the activation of water tariff and explore the effects of the Tariff in Bethany city was high, the mean for this degree was (2,46) and the standard deviation was (0,31).

**The second question: What are the most important questions in the study (people awareness towards the water tariff)?**

To answer this question the means and the standard deviations were analyzed to find the most important questions in the study and the results are shown in table # (20).

**Table # (20): Means and the standard deviations for the questions of the study as ordered with its importance**

| | **Statement** | **Mean** | **Std. Deviation** | **Degree** |
|---|---|---|---|---|
| q3 | There is a minimum amount for water use should the consumer pay whenever the consumer does not use the water | 2.60 | 0.69 | High |
| q4 | You are able to realize and understand the water invoice | 2.58 | 0.76 | High |
| q8 | In your opinion, the private water parameter save additional amounts to be paid | 2.53 | 0.75 | High |
| q7 | In your opinion, the shared water parameter leads to pay additional amounts of money, due to the categories division | 2.37 | 0.82 | High |
| q6 | In your opinion, the high water exaggeration leads to increase the price of the cube of water | 2.37 | 0.79 | High |
| q2 | The municipality of Bethany city divides the water tariff into categories | 2.28 | 0.73 | Middle |
| q5 | The water tariff set by the municipality of Bethany convenient with your ability to pay | 2.28 | 0.92 | Middle |
| q1 | The water tariff in Bethany unified or decreased | 2.17 | 0.67 | Middle |
| | **Total degree** | 2.39 | 0.40 | High |

**The third question: What are the most important questions in the study (Consumer Awareness Measuring about Water losses rate)?**

To answer this question the means and the standard deviations were analyzed to find the most important questions in the study and the results are shown in table # (21).

**Table # (21): Means and the standard deviations for the questions of the study as ordered with its importance**

| | Statement | Mean | Std. Deviation | Degree |
|---|---|---|---|---|
| q3 | You inform the maintenance department in the Municipality immediately after a break in the water network, which leads to lose and waste large quantities of water | 2.85 | 0.51 | High |
| q2 | In your opinion, the high percentage of water waste affects the efficiency of water service obtained from the Municipality of Bethany | 2.81 | 0.48 | High |
| q1 | In your opinion, the rate of water losses high in Bethany | 2.62 | 0.66 | High |
| q5 | Do you think that the percentage of losses in the town could affect the water tariff at the municipality of Bethany. | 2.59 | 0.67 | High |
| q4 | You are reporting thefts and illegal links to Bethany Municipality | 2.18 | 0.87 | Middle |
| | **Total degree** | 2.60 | 0.39 | High |

The table above shows that the people in Bethany city has awareness and responsibility toward the damages and water losses in the network, as they inform the maintenance department regarding any water losses in the network with a high degree of 2.85.

**The fourth question: What are the most important questions in the study (Technical Staff efficiency)?**

To answer this question the means and the standard deviations were analyzed to find the most important questions in the study and the results are shown in table # (22).

**Table # (22): Means and the standard deviations for the questions of the study as ordered with its importance**

| | Statement | Mean | Std. Deviation | Degree |
|---|---|---|---|---|
| q3 | you inform the Municipality of Bethany if the water meter in your home stopped working | 2.77 | 0.60 | High |
| q2 | you know that there is a natural depletion in the water network that leads to water loss | 2.45 | 0.78 | High |
| q4 | you know that the technical repairs of the network cost the municipality funds periodically and are calculated through the water tariff | 2.42 | 0.76 | High |
| q5 | you know that the salaries of the technical staff who are responsible about the water network are covered and calculated through the water tariff that appliesat the municipality of Bethany | 2.41 | 0.76 | High |
| q1 | you know that the municipality of Bethany get water from multiple water sources. | 2.09 | 0.85 | Middle |
| | **Total degree** | 2.42 | 0.49 | High |

### 4.3.2 The hypotheses examination:

**<u>The first hypothesis:</u> There were no significant differences at α=0.05 of the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the Size of Family**

We used (One way analysis of variance) to test hypotheses for the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the Size of Family.

**Table # (23): The results of one-way analysis of variance for the level of the water tariff activation, and explore the Tariff effects in Bethany city according to the Size of Family**

| | DF | Sum of squares | Mean Squares | F | Sig |
|---|---|---|---|---|---|
| Between groups | 2 | 0.094 | 0.047 | 0.446 | 0.642 |
| Within groups | 72 | 7.598 | 0.106 | | |
| Total | 74 | 7.692 | | | |

The results of analysis in the table above indicated that there were no significant differences at α=0.05 for the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the Sizeof Family.

**Table # (24): Numbers and means for the difference of the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the Size of Family**

| Size of Family | Number | Mean | Std. Deviation |
|---|---|---|---|
| 1-4 | 24 | 2.45 | 0.29 |
| 5-7 | 42 | 2.48 | 0.32 |
| More than 7 | 9 | 2.37 | 0.40 |

**<u>The second hypothesis:</u> There were no significant differences at α=0.05 of the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the Education Level**

We used (One way analysis of variance) to test hypotheses for the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the Education Level

**Table # (25): The results of one way analysis of variance for the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the Education Level**

| | DF | Sum of squares | Mean Squares | F | Sig |
|---|---|---|---|---|---|
| Between groups | 3 | 0.604 | 0.201 | 2.093 | 0.108 |
| Within groups | 74 | 7.124 | 0.096 | | |
| Total | 77 | 7.728 | | | |

The results of analysis in the table above indicated that there were no significant differences at α=0.05 for the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the Education Level.

**Table # (26): Numbers, means, and standard deviation for the difference of the level of activation of water tariff and explore the effects of the Tariff in Bethany city according to the Education Level**

| Education Level | Number | Mean | Std. Deviation |
|---|---|---|---|
| Tawjihi | 24 | 2.43 | 0.37 |
| Tawjihi/Diploma | 31 | 2.38 | 0.32 |
| BA | 15 | 2.60 | 0.16 |
| More than BA | 8 | 2.57 | 0.22 |

**<u>The third hypothesis:</u> There were no significant differences at α=0.05 of the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the Type of work**

We used (One way analysis of variance) to test hypotheses for the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the Type of work

**Table # (27): The results of one way analysis of variance for the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the Type of work**

| | DF | Sum of squares | Mean Squares | F | Sig |
|---|---|---|---|---|---|
| Between groups | 2 | 0.106 | 0.053 | 0.529 | 0.592 |
| Within groups | 65 | 6.538 | 0.101 | | |
| Total | 67 | 6.645 | | | |

The results of analysis in the table above indicated that there were no significant differences at α=0.05 for the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the Type of work

**Table # (28): Numbers, means, and standard deviation for the difference of the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the Type of work**

| Type of work | Number | Mean | Std. Deviation |
|---|---|---|---|
| Governmental | 15 | 2.53 | 0.23 |
| Non-Governmental | 19 | 2.42 | 0.42 |
| Self-employed | 34 | 2.47 | 0.27 |

**<u>The fourth hypothesis:</u> There were no significant differences at α=0.05 of the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the monthly income**

We used (One way analysis of variance) to test hypotheses for the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the monthly income

**Table # (29): The results of one way analysis of variance for the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the monthly income**

| | DF | Sum of squares | Mean Squares | F | Sig |
|---|---|---|---|---|---|
| Between groups | 4 | 0.395 | 0.099 | 0.997 | 0.415 |
| Within groups | 66 | 6.542 | 0.099 | | |
| Total | 70 | 6.937 | | | |

The results of analysis in the table above indicated that there were no significant differences at α=0.05 for the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the monthly income

**Table # (30): Numbers, means, and standard deviation for the difference of the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the monthly income**

| Monthly Income | Number | Mean | Std. Deviation |
|---|---|---|---|
| 1425-2500 | 33 | 2.49 | 0.22 |
| 2501-3500 | 17 | 2.54 | 0.22 |
| 3501-4500 | 9 | 2.43 | 0.53 |
| 4501-5500 | 4 | 2.34 | 0.29 |
| 5501 and more | 8 | 2.31 | 0.46 |

**<u>The fifth hypothesis:</u> There were no significant differences at α=0.05 of the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the using Water parameter privately or shared one.**

We used (t-test) to test hypotheses for the differences of the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the using Water parameter privately or shared one.

**Table (31): The results of (t-test) for the differences of the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the using Water parameter privately or shared one**

| using Water parameter privately or shared one | Number | Mean | Std. Deviation | DF | T | Sig |
|---|---|---|---|---|---|---|
| Private | 40 | 2.57 | 0.21 | 75 | 3.118 | 0.003 |
| Shared | 37 | 2.36 | 0.35 | | | |

The results of analysis in the table above indicated that there were significant differences at α=0.05 for the level of the activation of water tariff and explore the effects of the Tariff in Bethany city according to the using Water parameter privately or shared one, the differences in favor of people whom using Water parameter privately with mean (2.57), compare of people whom using Water parameter shared.

**Table # (32): Rank the following points monthly based on its influence on water tariff in Bethany Municipality and its influence on the improvement of water service:**

| Points monthly | Rank |
|---|---|
| **Technical effectiveness for water network** | 5 |
| **Rate of water Waste in the water network** | 1 |
| **The system of calculating the water tariff** | 2 |
| **Technical and managerial staff in the water service** | 3 |
| **The source of water where the municipality obtain its share** | 4 |

## 4.4 Discussion of the results:

In this section, the most important results will be discussed through presenting the differences between both methods (qualitative and quantitative), that will be divided into 5 categories represents the hypothesis of the study, which leads and influences the water tariff calculation. Herein, the discussion of the results divided into two main hypothesis that represents the variables of the study, and will be investigated by both methods results.

**First Main Hypothesis: People have awareness towards water tariff issues in Bethany (water tariff\ water losses\ technical efficiency).**

The results regarding this hypothesis will be discusses throughout the quantitative analysis, when the questionnaire directed to the community awareness of the water issues in Bethany city. As results show that, there are a high rate of community awareness regarding all water service issues like tariff, technical issues, water losses and other factors. Which means that the community members have the awareness of the water service tariff, and its components. But, the researcher thinks that there is high rate of objectivity among the answers of the community, with the reality of the water tariff and service, in which the water tariff rates are not applicable with the cost of the water from the both resources (Bethany's well and JEHON). According to the experience of the researcher in the municipality of Bethany as a local council member, there is a lost in delivering the water to the community tolerated by municipality for the following reasons:

1- The cost of water from both resources in addition to the running cost is not applicable. When the running cost includes: salaries, cars expenses of the technical staff, taxation, water network materials, and other costs.

2- There are reports at municipality show that there is a high rate of water thieving, and more than two families share on water parameter.

3- The water losses in Bethany considered a very high rate, which cost the municipality much more than original cost. Water without use is payable by Bethany municipality.

**Second Main Hypothesis: There is a proper and applicable water tariff system in Bethany.** This main hypothesis will be examined through the following minor hypotheses:

**Hypothesis #1: Experts at Bethany municipality have taken into consideration the multiple water sources when they designed the current model of water tariff.**

In order to test this Hypothesis, the researcher found that all answers of the interviewees (experts) are drained into two main resources and they are: (1) JEHON the Israeli Company (2)and the Bethany's well NO3. Where, the expert have taken into consideration when they see the water tariff system which is applied at the municipality the cost of each source of water. as they said; the cost of water that come from Bethany's well NO.3 is 2.60 NIS for per cubic meter while the cost of the water which come from the Israeli source is 3.10 NIS for per cubic meter. Whereas, the quantitative results have showed the unawareness of the people living in Bethany about the water resources. The researcher can return that to the unconcern of the community members of the water resources, they care just about the delivery of the water.

In comparing with literatures and theoretical framework mentioned, the municipality sells the cube meter to people for the domestics use with 5.5 NIS. On average, in which they sell water for community with a loss toward the municipality whereas producing one cubic meter costs about 6.80 NIS. When we add the other expenses for the original price. In addition, if we take the water losses into consideration it costs about 8.8 Nis. For per cubic meter.

This result let the researcher says that Bethany municipality loses from delivering the water with this rate of tariff, because they do not taking into consideration other expenses and costs like salaries, technical costs and other very important factors.

From above mentioned results, the researcher can affirm that the current water tariff system is not taking into consideration the multiple water resources, in case of they are losing when they sell the water with the mentioned rate. In the previous studies, the study of (Li, 2007) founded that China has reformed the water tariff system according to a material policy that takes into consideration all other expenses rather than the water delivering expenses. But in Bethany the situation is different due to the lack of control on the water resources, when municipality buying the water from the other side (Israel) which is cost more than the local resource and more expensive. However, the researcher

can say that this result must be taken into consideration in order to reform the water tariff system, which takes the costs of multiple water resources and other expenses into consideration, according to the lack of water resources that the government controls, which might be nothing as a state under occupation.

**Hypothesis #2: Type of energy that used in water production and distribution into Bethany water network have an effect onto water tariff at Bethany Municipality.**

Energy use is a crucial factor that affects any type of production, in this case of study the most familiar energy used into producing the water from both resources is electricity, which is bought from the Israeli side and costs expensive. For this regard, the interviewees said that this type of energy is too expensive comparing with other energy resources, which plays important role into calculating the water tariff. The researcher can say that the water production in Bethany has double cost according to the cost of electricity used in water production, and the cost of water bought from Israel.

Moreover, the study of (Jabber, 2006) says that Gaza municipalities do not take into consideration the electricity costs into the water tariff system, whereas Bethany municipality taking into consideration this important factor. Here, the researcher can say that this hypothesis is right after investigations of the results in this factor (variable) the type of energy used in Bethany toward water production is taking into consideration in the water tariff system.

**Hypothesis #3: When experts designed the current water tariff system at Bethany municipality they have taken into consideration the full cost recovery which includes the administrative and technical expenses in order to keep the sustainability of the technical efficiency of the water network .**

In order to examine this hypothesis, the results from both methods (Quantitative & Qualitative) have taken into consideration, whenever the experts affirmed that when water tariff set up for community in Bethany city, the salaries of technical staff and administrative employees taken into consideration to be calculated from the amount obtained from the water service money collection. In addition, the value added tax is calculated whenever the municipality set up the water tariff. Whereas, some of experts added that the expenses of frequent maintenance regarding the water network, has taken into consideration whenever the water tariff is settled up.

Moreover, regarding the awareness of community of the technical staff efficiency high percentage of the community members said that they inform the maintenance department in the Municipality immediately after a break in the water network, which leads to lose and waste large quantities of water. This means that the community members are concerning in maintenance of their parameters and network, so they feel responsible toward the water utility. In addition, the degree of the technical repairs of the network cost the municipality funds periodically, calculated through the water tariff comes high by the community members. Which means that there is awareness by the individuals of the situation of the municipality regarding the cost of technical maintenance, such as: materials, cars, fuel, and other running cost of the water service delivery.

Now, I can say that the hypothesis is correct in most aspects of the previous presentation, this means that When experts designed the current water tariff system at Bethany municipality they have taken into consideration the full cost recovery which includes the administrative and technical expenses in order to keep the sustainability of the technical efficiency of the water network. But, this hypothesis is linked with the next one, that is influenced by this hypothesis. In which the technical efficiency of the water service staff affects the rate and quantity of the water waste, that might be reduced and benefit the municipality and community members as presented in the next hypothesis.

**Hypothesis #4: Water losses in Bethany affect the current water tariff, which is applied at Bethany municipality.**

Regarding the water losses in Bethany city, there are different results and answers explored by the interviewee, in which most of the experts said that the water waste rate affects the proper calculation of the water tariff. This is definitely true, because there are high quantity of water losses without any use of community, which must be paid to the Israeli resource and the Bethany well partner's costs. Moreover, the justification of this result could be the influence of the waste rate on the proper calculation of tariff, which means that people in Bethany city share a part of water waste cost with the municipality. Whereas, other interviewees said that there is no effect of the waste rate on the calculation of tariff, they return that to the equity scale of setting up the tariff.

Besides, this loss of the municipality and community from the waste of the water, it doesn't raising up the amount of the tariff in order to cover its loss from the water waste. The quantitative results show that this affects the money come from the financial ministry

of Palestine toward development projects, that means the development fund goes to cover the water waste loss, which leads to reduce the development issues in the city of Bethany, in order to cover the loss of waste water. The high percentage of water waste affects the efficiency of water service obtained from the Municipality of Bethany, the rate of water losses high in Bethany, and the percentage of losses in the town could affect the water tariff at the municipality of Bethany.

Aforementioned presentation discussion for the hypothesis # 4, affirms that the water losses affect the water tariff rate applied in Bethany city.

# Chapter Five: Conclusions of the study & Recommendations:

**5.1 Introduction**

**5.2. Conclusion**

**5.3. Study Contributions**

**5.4. Future Researches:**

**5.5. Recommendations**

# Chapter Five:

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# Conclusions of the study & Recommendations:

## 5.1 Introduction

This chapter includes the summary of the study consists of conclusion and study contribution in the field of water utility, in addition to its role in development of Bethany City. Moreover, the chapter provides a number of recommendations that could be benefit for municipality of Bethany and community, in addition to its benefit for researchers.

## 5.2. Conclusion

Palestine has lack of studies talking about the water service issues, even that the water strategic policies is pending due to the non-controlling of the water resources by the Palestinian government. Water resources are considered a strategic resources for any state, whereas the Palestinian government can do nothing toward this issue.

According to the shortage of studies conducted about the subject of water tariff in the world generally, and in Palestine particularly. This study is the only study that conducted about the subject of water tariff and its components, which talks about the factors play roles into the calculation of water tariff, in addition to examine the awareness of the community toward water tariff calculation factors.

The study shows similarly results between experts and community members theoretically, but in fact and reality there is differences. In which the experts think that the water tariff system is taking into consideration all influenced factors, except the water waste. When the water waste is a fatal factor that must be reduced for the benefit of the municipality, unless the municipality and community member tolerate the unused quantities of water that goes waste, and must be paid for the water resources.

The researcher concentrate on this issue because the factor of water waste affects the water tariff system significantly. In order to prove that the researcher return to the study of Mutikanga et, al. (2011), which said that water utilities particularly in the developing countries continue to operate with considerable inefficiencies in terms of water and revenue losses. That means that the rate of water losses affects the water tariff amount, in which the daily quantities of water losses, causes by damaged networks, shared parameters, and thieving water occurred by community cost the city al its financial resources, and the municipality remains thinking of how to cover the cost of water, and forget its development strategic plans.

### 5.3. Study Contributions

This study contributes in the field of water service and the field of development as following:

First: this study considered one of the most important studies in the subject of water tariff and water service in general. After looking for studies conducted in this field, the researcher reaches that no studies have conducted into the details of the water service like water tariff systems in Palestine, which makes the study important for upcoming researchers in addition to the policy makers.

Second: this study shows the importance of the water services in addition to the concerns of the municipality of Bethany in this issue, and neglecting other development aspects in the city.

### 5.4. Future Researches:

During the conducting of this study and after reaching the results of the study, the researcher recommends two main researches titles to be conducted in the near future by upcoming researchers as following:

1. "Toward proper and applicable water tariff at Bethany Municipality".
2. “Water Tariff System applied in the cities of Palestine, according to the Israeli and Palestinian government’s policies”.
3. “How can the municipalities build an applicable water tariff in each city accordingly with its community components?”

### 5.5. Recommendations

According to the results and conclusions extracted from the study progress, the researcher can recommend the following:

1- The municipality of Bethany should work onto changing its directions toward unifying the water tariff among the domestic and commercial sectors. Which leads to reducing the expenses of the municipality.
2- The municipality must raising funds toward renovation and maintenance of the water networks in Bethany, which means that the water tariff monthly amount can cover the water cost, and makes the municipality think about other development issues in the city.
3- All required solutions such as: monitoring and controlling the water parameters, shared parameters, water theft, and detecting the networks of water, must be occurred frequently by the water department at the municipality of Bethany.
4- It's recommended that the municipality install water meters at the entrance of all areas to monitor the amount of water losses in the area.

## References:

### Arabic References:


1. Jaber, I. (2006). Water tariff at Gaza strip municipalities' critical study. Islamic University Journal of Human Research, 14-23.
2. Jaber, I. (2004). The strategy of addressing the water crises in the Gaza Strip. Islamic University Journal of Human Research, 22-25.
3. Al-Tamimi, A. (2010). Water tariff in Bani Zaied Municipality: case study. Palestinian Hydraulics Group, 3-14.
4. Rabi, A. and Mohammad, Z. (2013). The New Water Tariff System in Palestine: Between Economic Efficiency and Social Justice. Palestine Economic Policy Research Institute, 9-13.
5. Alrumhi, H. (2010). A study about the variation in water tariffs in the areas of the Palestinian Authority. Jerusalem Center for Legal Aid and Human Rights, Ramallah.
6. Bani Hani, M. (1995). **Water in Jordan**, PP: 25-25.
7. Republic of Yemen. (2003). National Strategy and Water Investment Program. Ministry of Water and Environment.
8. Al-Jaiousi, A. (2002). Islamic Water Management. A panel discussion on the sidelines of the 3rd Arab Regional Water Conference, pp: 41-42.
9. Faroqi, N. (2002). Sectoral water markets in the Middle East and North Africa. International Development Research Center (IDRC), pp: 77.
10. Palestinian Water Authority reports. (2015). Quantity of Water Supply for Domestic Sector in the West Bank urban Governorate: Year 2010 – 2015.
11. The Palestinian water sector regulatory council. (2012). Report about the new water tariff system that approved in Jerusalem undertaken.
12. Palestinian Water Authority/ reports. (2014, 2015, 2016). Statistics about water bells collecting in urban municipalities in the West Bank, the annual reports.
13. Palestinian water sector regulatory council. (2015). The annual report.
14. Bethany Municipality. (2019). Leaflets about the town.
15. Palestinian Central Bureau of Statistics. (2019). the annual reports book.
16. Bethany Municipality. (2019). internal reports and statistics.
17. Palestine Economic Policy Research Institute. (2013). The new water tariff system in Palestine between economic efficiency and social justice, MAS.

**Foreign references:**


1. Boland, J. and Whittington, D. (1997). The Political Economy of Increasing Block Tariffs for Water in Developing Countries. EEPSEA Special and Technical Paper, Economy and Environment Program for Southeast Asia (EEPSEA), pp: 4-16.
2. Dinar, A. (2000). **The Political Economy of Water Pricing Reforms**. World Bank, pp: 38-44.
3. Robinson, J. (2013). Contested Water: The Struggle against Water Privatization in the United states and Canada. Urban and Industrial Environments, PP: 72-84.
4. Muller, M. (1999). Draft Tariff Regulations for Water Services. Center of water low policy and science low of Dundee, pp: 24-63.
5. Water Services. (2016). Planning and Information: Business Intelligence Support: Water Services Tariffs/ a national assessment of water services tariffs from source to tap and return flows to source, Water Services: Planning and Information: Business Intelligence Support, pp: 24-38.
6. Liu, J. (2013). A simple approach to assess water scarcity integrating water quantity and quality, Ecological Indicators, pp: 16-23.
7. American Water Works Association (1988 ): Estimating urban residential water demand: effects of price structure, conservation, and education, University of North Texas .
8. Beecher, J. Mann, P. and Stanford, J. (1993). Meeting water utility revenues requirements: financing and ratemaking alternatives. The National Regularity Research Institute, the Ohio State University, pp: 79-89.
9. Lifongo, L. and Gaskin, S. (2009). Municipal drinking water source protection in low income countries: case of Buea municipality- Cameron. RG scientific recruitment, pp: 27-36.
10. Herath M. Gunatilake, C. Gopal, A. and Inoka, C. (2001). The Economics of Household Demand for Water: The Case of Kandy Municipality- Srilanka. International Journal of Water Resources Development, pp: 174-188.
11. Rietveld, P. Jan, R. and Bertzwart. (1997). Estimating Water Demand in urban Indonesia: A Maximum Likelihood Approach to Block Rate Pricing Data. Vrije Universiteit Amsterdam. PP: 12-23.

12. Kim, J. (2016). Impact of performance appraisal justice on the effectiveness of pay-for-performance systems after civil service reform. SAGE Journals, pp: 24-26.
13. Schwarz, J. (1991**).** A water odyssey: the story of metropolitan water district of southern California.
14. Blanc, D. (2008). A framework for analyzing tariffs and subsidies in water provision to urban households in developing countries, economic and social affairs DESA Working Paper No. 63.
15. Lefebvre, M. Morardet, M. Montginoul, S. and Farolfi, S. (2005). How to finance multiple use water systems for the rural poor? Lessons learnt from the domestic water sector in the Olifants River Basin. South Africa, RG scientific recruitment, pp: 27-36.
16. Grafton, R. Chu, L. and Kompas, T. (2015). Optimal water tariffs and supply augmentation for cost-of-service regulated water utilities. Utilities Policy, Elsevier, vol. 34(C), pp: 54-62.
17. OECD (1987). Pricing of Water Services, Paris, Organization de Cooperation et de Development Economics Organization for Economic Co-operation and Development, pp: 53-62.
18. Hoekman, B. (2002). Eliminating Excessive Tariffs on Exports of Least Developed Countries. The world Bank economic review, pp: 11-16
19. Awad, I. Murrar, A. Abdel Fattah, H. Yaqob, E. (2017). The Impact of Water Price on the Financial Sustainability of the Palestinian Water Service Providers. Journal of Environmental Protection.
20. Creswell, J. W. (1997). Qualitative inquiry and research designs: Choosing among five traditions. Thousand Oaks, CA: Sage.
21. Dey, Ian. (2005). Qualitative Data Analysis. 2nd edition, Routledge Taylor & Francis Group, New York, USA.
22. Flick, Uwe. (2013). The Sage Handbook of Qualitative Data Analysis. Sage Publications Inc. Berlin, Germany, Retrieved online from: http://www.ewi-psy.fu-berlin.de/ einrichtungen/ arbeitsbereiche/ qualitative sozial-bildungsforschung /Medien /58869_Flick__The_SAGE_HB_of_Qualitative_Data_Analysis_.pdf
23. Gabriel, C. (1990). The validity of qualitative market research, Journal of Market Research Society, 32, 4, pp. 507-519.

24. Gardner, W. (1996). Using the Myers-Briggs Type Indicator to Study Managers: A Literature Review and Research Agenda. Journal of Management. Vol: 22, No. 1: pp. 45-83.
25. Guba, E. G., & Lincoln, Y. S. (1994). Effective evaluation. San Francisco, CA: Jossey-Bass Publishers.
26. Kawulich, Barbara. (2004). Qualitative Data Analysis Techniques. University of West Georgia, Conference paper, RC33 (ISA), At Amsterdam, The Netherlands.
27. Lacey A. and Luff D. (2007). Qualitative Research Analysis. The NIHR RDS for the East Midlands / Yorkshire & the Humber.
28. Miles, M. B., &Huberman, A. M. (1994). Qualitative data analysis (2nd ed.). Thousand Oaks, CA: Sage Publications.
29. Saunders, M., Lewis, P., and Thornhill, A. (2009). Research Methods for Business Students. 5th Edition. Pearson Education. Retrieved from http://doha.ac.mu/ebooks/Research%20Methods/ResearchMethodsForBusinessStudents_Saunders.pdf
30. Schneider, Daniel K. (2005). Quantitative Data Analysis, University of Geneva, TECFA, Version 0.7, Geneva, Switzerland, Retrieved from: https://tecfa.unige.ch/guides/methodo/edu-tech/slides/analysis-quant.pdf
31. Yin, R. K. (1994). Case study research: Design and methods (2nd ed.). Newbury Park, CA: Sage Publications.

**Literatures:**

1. Zhong, Li-Jin & Mol, Arthur. (2008). Participatory environmental governance in China: Public hearings on urban water tariff setting. Journal of environmental management. 88. 899-913. 10.1016/j.jenvman.2007.04.018.
2. Foletti, L. , Fugazza, M. , Nicita, A. and Olarreaga, M. (2011). Smoke in the (Tariff) Water. The World Economy, 34: 248-264. doi:10.1111/j.1467-9701.2010.01318.x
3. Liu, Junguo & Savenije, Hubert & Xu, Jianxin. (2003). Water as an economic good and water tariff design: Comparison between IBT-con and IRT-cap. Physics and Chemistry of the Earth, Parts A/B/C. 209-217.
4. Smout, Ian & Kayaga, Sam. (2014). Tariff structures and incentives for water demand management. Proceedings of the ICE - Water Management. 167. 448-456. 10.1680/wama.12.00120.

5. Grafton, R. & Chu, Long & Kompas, Tom. (2015). Optimal water tariffs and supply augmentation for cost-of-service regulated water utilities. Utilities Policy. 34. 10.1016/j.jup.2015.02.003.
6. Boland, John & Whittington, Dale. (1997). Water tariff design in developing countries: disadvantages of increasing block tariffs (IBTs) and advantages of uniform price with rebate (UPR) designs.
7. Blanc, D. (2008). A Framework for Analyzing Tariffs and Subsidies in Water Provision to Urban Households in Developing Countries. DESA Working Paper No. 63 ST/ESA/2008/DWP/63.
8. Salama (2014) the conflict over water in Palestine, Journal of Palestinian Affairs, edition 257.

# Appendices:

## Appendix # 1: the Interview Questions

Interview with Experts

The researcher Afaf Faroun is doing a study that aims to define the activation of water tariff and explore the effects of the Tariff in Bethany city. The researcher is conducting this study as complementary of the requirement of obtaining the Master Certificate from Al- Quds University. Your answers will be much appreciated and valuable toward conducting a strong study that will provide number of results and recommendations, which might be benefit for decision makers toward rational water tariff development. The researcher will be committed and confirmed that your answers will be used for scientific issues only and will be treated in very high level of confidentiality.

**Thank you**

**The Researcher**

**First Axis: Multiple Water Resources**

1. What are the water resources that Bethany municipality obtains its monthly share?
2. How much is the water share in Cube Meter from those resources?
3. How much the production of water costs from those resources?
4. Do you believe that unified water tariff beside the multiple resources affect the water economical efficiency?

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**Second Axis: Energy Used**

1. What type of energy used to operate the water extraction equipment from the well of the Artesian Bay?
2. Is this type of energy used expensive or appropriate for the current water pricing in the town of Al-Eizariya?
3. If the energy used is electrical power, how do you estimate the monthly bill of electricity used to extract and pump water in the network?
4. Do you consider the type and cost of energy used to calculate the water tariff in your opinion?

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**Third axis: Technical competence:**

1. Is the equipment used to pump water from the Wadi Al-Jaheer waterway to the water network using modern or old technology?
2. Are pumps and modern equipment used within the water network to help pump water to the entire network?
3. Are additional tanks and reservoirs used within the water network in the town of Al-Eizariya?
4. Do you think that these pumps and modern equipment, tanks and additional reservoirs cost the municipality additional costs?
5. In the event of faults in the pumps Is there a technical staff to repair the defect in a timely manner?
6. In your opinion, if more advanced equipment is available, does this affect the reduction of operational costs of water extraction and distribution?

---

**Fourth Axis: Tariff calculation system.**

Please answer the following questions with yes or no:

• In developing the tariff system in the municipality of Al-Eizariya, the salaries of the administrative and technical water department staff were taken into account from the funds collected by the Municipality from collecting water. ( )

• In establishing the tariff system in the municipality of Al-Eizariya, the calculation of operating costs was taken into account from the funds collected by the municipality from collecting water. ()

• When establishing the water tariff system in the municipality of Al-Eizariya, the value of the added tax. ()

• In establishing the water tariff system in the municipality of Al-Eizariya, periodic maintenance expenses were taken into account due to the natural depreciation of the water network. ( )

• In developing the water tariff system in the municipality of Al-Eizariya, the percentage of technical and commercial trade losses in the town was taken into consideration. ( )

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**Fifth Axis: percentage of losses.**

1. In your opinion, does the high loss rate in the town of Al-Eizariya affect the correct calculation of the value of the water tariff?

2. Are the authorities responsible for supplying the water network in the town of Al-Eizariya to raise the tariff to cover the municipality's loss due to the high losses?

3. How much is the technical loss in the town of Al-Eizariya at present and what are the solutions that the municipality is doing to alleviate this percentage?

4. How much is the percentage of commercial losses in the town of Al-Eizariya at present and what are the solutions that the municipality is doing to alleviate this percentage?

**Appendix # 2:** **Questionnaire**

**Questionnaire for people awareness into Bethany City**

The researcher Afaf Faroun is doing a study that aims to define the activation of water tariff and explore the effects of the Tariff in Bethany city. The researcher is conducting this study as complementary of the requirement of obtaining the Master Certificate from Al- Quds University. Your answers will be much appreciated and valuable toward conducting a strong study that will provide number of results and recommendations, which might be benefit for decision makers toward rational water tariff development. The researcher will be committed and confirmed that your answers will be used for scientific issues only and will be treated in very high level of confidentiality.

**Thank you**

**The Researcher**

**Part One: Demographic Information**

1- Household head: □ Yes □ No
2- Size of Family: □ 1-4 □ 5-7 □ More than 7
3- Education Level: Less than Tawjihi Tawjihi/Diploma BA
More than BA
4- Do you Have a work recently: Yes No
5- Type of work: □ Governmental □ Non-Governmental □Self-employed
6- Monthly Income: □ 1425-2500 □ 2501-3500 □ 3501-4500
□ 4501-5500 □ 5501 and more
7- Do you use Water parameter privately or shared one: Private Shared
8- Are you committed with paying the monthly water invoice: Yes NO
Usually

**Part Two: people awareness of the water tariff**

| # | Sentence | Yes | No | I Do not know |
|---|---|---|---|---|
| 1 | Is the water tariff in Bethany city unified or mounted? | | | |
| 2 | Is the municipality of Bethany city divides the water tariff into categories? | | | |
| 3 | Is there a minimum amount for water use should the consumer pay whenever the consumer does not use the water? | | | |
| 4 | Are you able to realize and understand the water invoice? | | | |
| 5 | Is the water tariff set by the municipality of Bethany convenient with your ability to pay? | | | |
| 6 | In your opinion, is the high water exaggeration leads to increase the price of the cube of water? | | | |
| 7 | In your opinion, is the shared water parameter leads to pay additional amounts of money, due to the categories division? | | | |

| | | | | |
|---|---|---|---|---|
| 8 | In your opinion, does the private water parameter save additional amounts to be paid? | | | |

**Part Three: Consumer Awareness Measuring about Water losses rate**

| # | Sentence | Yes | No | I Do not know |
|---|---|---|---|---|
| 1 | In your opinion, is the rate of water losses high in Bethany? | | | |
| 2 | In your opinion, Is the high percentage of water waste affects the efficiency of water service obtained from the Municipality of Al-Azariya? | | | |
| 3 | Do you inform the maintenance department in the Municipality immediately after a break in the water network, resulting in the loss and waste of a large proportion of water? | | | |
| 4 | Are you reporting thefts and illegal links to Al-Azariya Municipality? | | | |
| 5 | Do you think that the percentage of losses in the town could affect the calculation of the water tariff in the municipality of Al-Eizariya? | | | |

**Part Four: Technical Staff efficiency**

| # | Sentenc | Yes | No | I do not know |
|---|---|---|---|---|
| 1 | Do you know what is the source of water for which the Municipality of Al-Eizariya gets its share of the water through it? | | | |
| 2 | Do you know that there is a natural depletion in the water network that leads to leakage in the water? | | | |
| 3 | Do you inform the Municipality of Al-Azariya if the water meter in your home is broken? | | | |
| 4 | Did you know that the technical repairs of the network | | | |

cost the municipality funds periodically and are calculated through the water tariff?

5 Did you know that the staff of the technical staff responsible for the water network are covered and calculated through the water tariff approved in the municipality?

Thank you for your answers, finally please rank the following points mountly based on its influence on water tariff in Bethany Municipality and its influence on the improvement of water service:

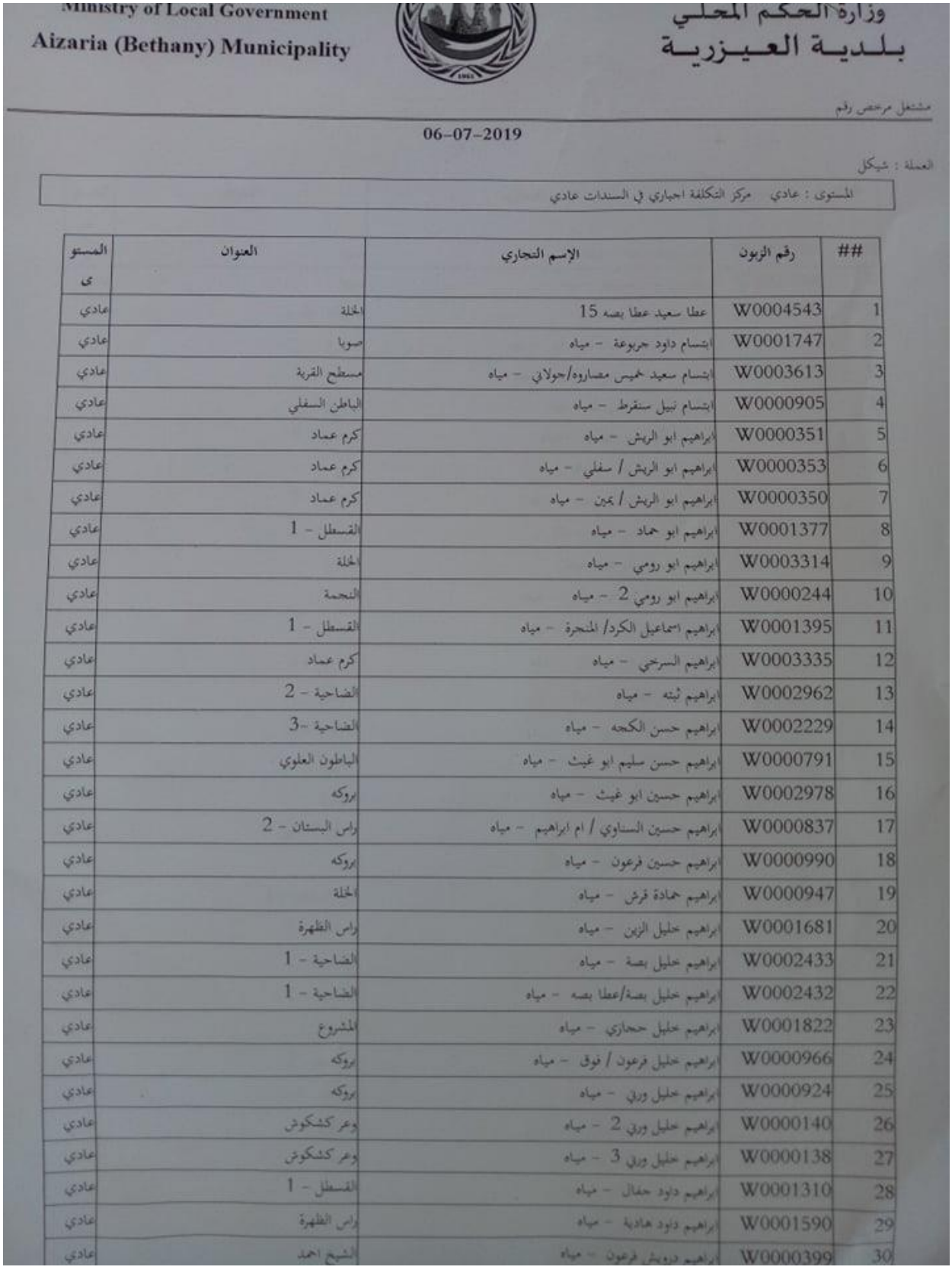
1- Technical effectiveness for water network. --------
2- Rate of water Waste in the water network. --------
3- The system of calculating the water tariff. --------
4- Technical and managerial staff in the water service. --------
5- The source of water where the municipality obtain its share.--------

## Appendix # 3: List of Interviewees

| Title | Name of the interviewee | Phone number |
|---|---|---|
| Mayor of Bethany Municipality | Issam Faroun | 0599255707 |
| Deputy Mayor of Bethany Municipality | Mohammed Matar | 0599255711 |
| Official of the Municipal Water Committee | Khalil Al-Sennawi | 0599114113 |

| | | |
|---|---|---|
| Director of the Water Department at Bethany Municipality | Eng. Mohammed Qatmeera | 0599115411 |
| Director of the Department of Health and Environment at Bethany Municipality | Hanna Mllokh | 0595255158 |
| Water Networks Maintenance Officer at Municipality of Bethany | Muhammed Abu Ziad | 0599114447 |
| The official of data entry of the water consumers at the Municipality of Bethany | Jamal Werni | 0599114116 |
| Member of the local council at Bethany Municipality and expert in water engineering | Dr. Musa Al-Khateeb | 0599114113 |
| Site manager at the Palestinian Water Authority | Dr. Ibrahim Awad | 0598914054 |

## Appendix # 4: list of Questionnaire Sample



Ministry of Local Government
Aizaria (Bethany) Municipality

وزارة الحكم المحلي
بلدية العيزرية

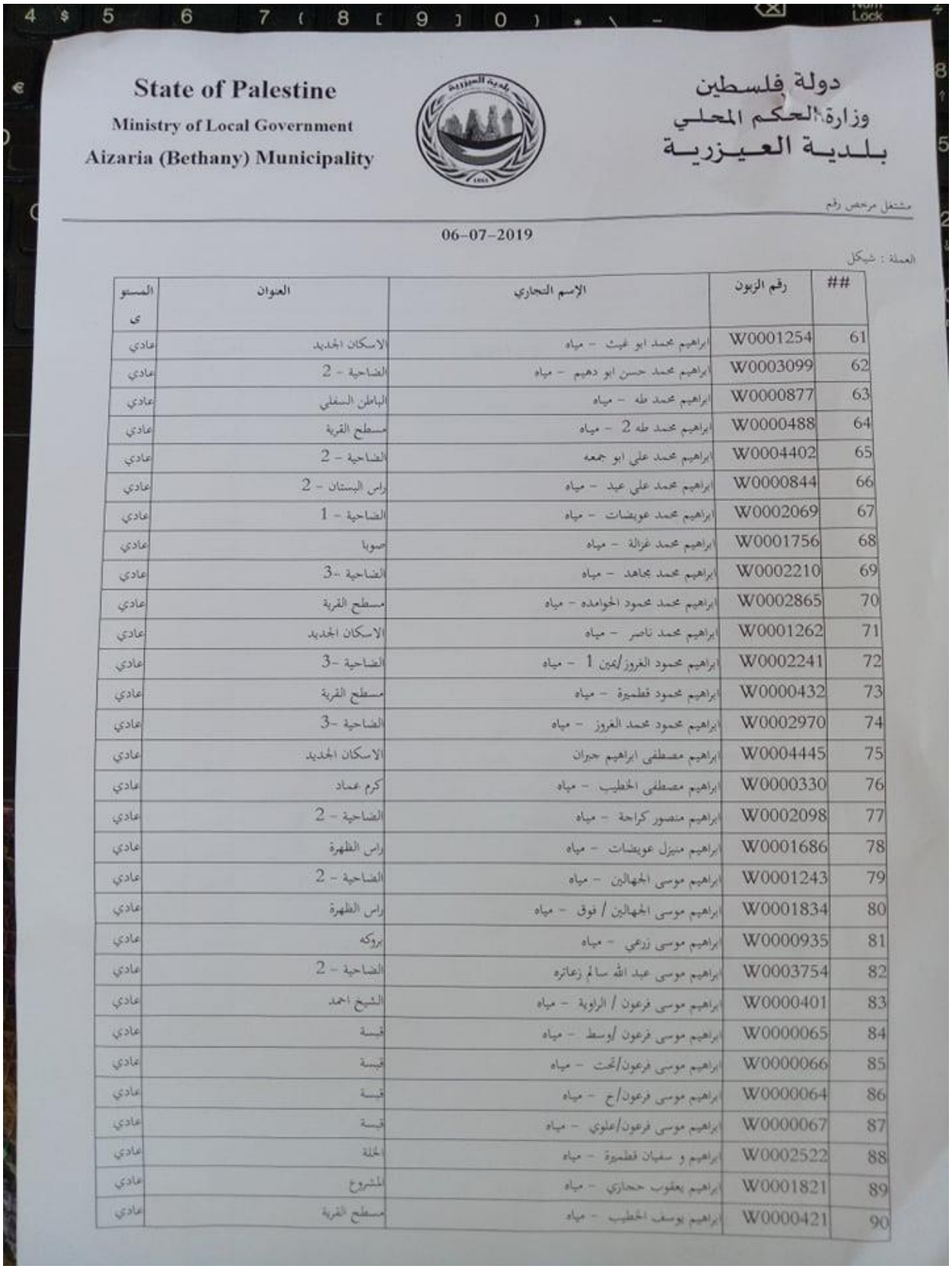
مشتغل مرخص رقم

06-07-2019

العملة : شيكل

المستوى : عادي مركز التكلفة اجباري في السندات عادي

| ## | رقم الزبون | الإسم التجاري | العنوان | المستوى |
|---|---|---|---|---|
| 1 | W0004543 | عطا سعيد عطا بصه 15 | الخلة | عادي |
| 2 | W0001747 | ابتسام داود جريوعة - مياه | صوبا | عادي |
| 3 | W0003613 | ابتسام سعيد خميس مصاروه/حولاني - مياه | مسطح القرية | عادي |
| 4 | W0000905 | ابتسام نبيل سنقرط - مياه | الباطن السفلي | عادي |
| 5 | W0000351 | ابراهيم ابو الريش - مياه | كرم عماد | عادي |
| 6 | W0000353 | ابراهيم ابو الريش / سفلي - مياه | كرم عماد | عادي |
| 7 | W0000350 | ابراهيم ابو الريش / يمين - مياه | كرم عماد | عادي |
| 8 | W0001377 | ابراهيم ابو حماد - مياه | القسطل - 1 | عادي |
| 9 | W0003314 | ابراهيم ابو رومي - مياه | الخلة | عادي |
| 10 | W0000244 | ابراهيم ابو رومي 2 - مياه | النجمة | عادي |
| 11 | W0001395 | ابراهيم اسماعيل الكرد/ المنجرة - مياه | القسطل - 1 | عادي |
| 12 | W0003335 | ابراهيم السرخي - مياه | كرم عماد | عادي |
| 13 | W0002962 | ابراهيم ثبته - مياه | الضاحية - 2 | عادي |
| 14 | W0002229 | ابراهيم حسن الكحه - مياه | الضاحية -3 | عادي |
| 15 | W0000791 | ابراهيم حسن سليم ابو غيث - مياه | الباطون العلوي | عادي |
| 16 | W0002978 | ابراهيم حسين ابو غيث - مياه | بروكه | عادي |
| 17 | W0000837 | ابراهيم حسين السناوي / ام ابراهيم - مياه | راس البستان - 2 | عادي |
| 18 | W0000990 | ابراهيم حسين فرعون - مياه | بروكه | عادي |
| 19 | W0000947 | ابراهيم حمادة قرش - مياه | الخلة | عادي |
| 20 | W0001681 | ابراهيم خليل الزين - مياه | راس الظهرة | عادي |
| 21 | W0002433 | ابراهيم خليل بصة - مياه | الضاحية - 1 | عادي |
| 22 | W0002432 | ابراهيم خليل بصة/عطا بصه - مياه | الضاحية - 1 | عادي |
| 23 | W0001822 | ابراهيم خليل حجازي - مياه | المشروع | عادي |
| 24 | W0000966 | ابراهيم خليل فرعون / فوق - مياه | بروكه | عادي |
| 25 | W0000924 | ابراهيم خليل وردي - مياه | بروكه | عادي |
| 26 | W0000140 | ابراهيم خليل وردي 2 - مياه | وعر كشكوش | عادي |
| 27 | W0000138 | ابراهيم خليل وردي 3 - مياه | وعر كشكوش | عادي |
| 28 | W0001310 | ابراهيم داود حمال - مياه | القسطل - 1 | عادي |
| 29 | W0001590 | ابراهيم داود هادية - مياه | راس الظهرة | عادي |
| 30 | W0000399 | ابراهيم درويش فرعون - مياه | الشيخ احمد | عادي |



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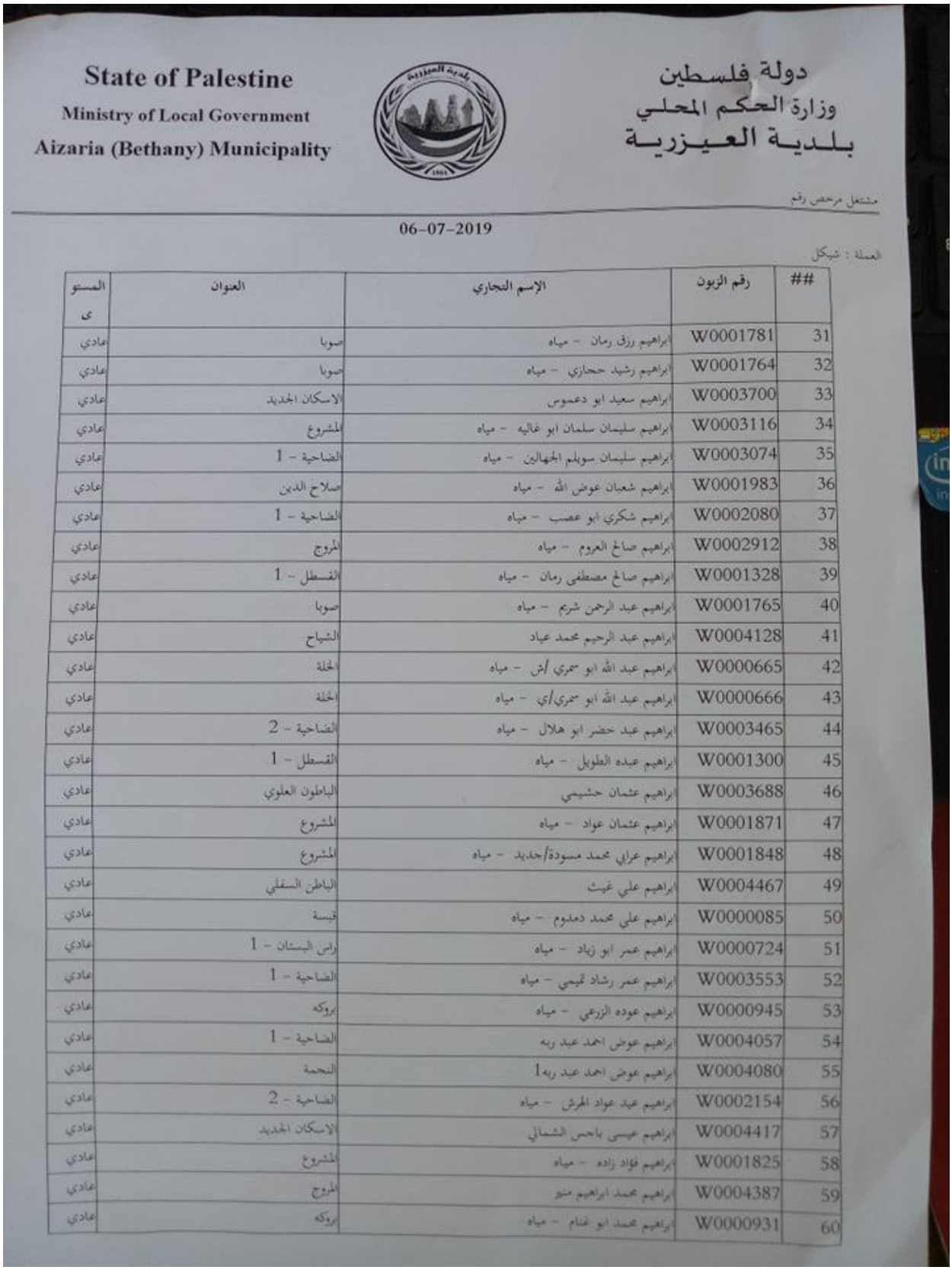
| ## | رقم الزبون | الإسم التجاري | العنوان | المستوى |
|---|---|---|---|---|
| 61 | W0001254 | ابراهيم محمد ابو غيث - مياه | الاسكان الجديد | عادي |
| 62 | W0003099 | ابراهيم محمد حسن ابو دهيم - مياه | الضاحية - 2 | عادي |
| 63 | W0000877 | ابراهيم محمد طه - مياه | الباطن السفلي | عادي |
| 64 | W0000488 | ابراهيم محمد طه 2 - مياه | مسطح القرية | عادي |
| 65 | W0004402 | ابراهيم محمد علي ابو جمعه | الضاحية - 2 | عادي |
| 66 | W0000844 | ابراهيم محمد علي عيد - مياه | راس البستان - 2 | عادي |
| 67 | W0002069 | ابراهيم محمد عويضات - مياه | الضاحية - 1 | عادي |
| 68 | W0001756 | ابراهيم محمد غزالة - مياه | صوبا | عادي |
| 69 | W0002210 | ابراهيم محمد مجاهد - مياه | الضاحية -3 | عادي |
| 70 | W0002865 | ابراهيم محمد محمود الحوامده - مياه | مسطح القرية | عادي |
| 71 | W0001262 | ابراهيم محمد ناصر - مياه | الاسكان الجديد | عادي |
| 72 | W0002241 | ابراهيم محمود الغروز/عين 1 - مياه | الضاحية -3 | عادي |
| 73 | W0000432 | ابراهيم محمود قطميرة - مياه | مسطح القرية | عادي |
| 74 | W0002970 | ابراهيم محمود محمد الغروز - مياه | الضاحية -3 | عادي |
| 75 | W0004445 | ابراهيم مصطفى ابراهيم جبران | الاسكان الجديد | عادي |
| 76 | W0000330 | ابراهيم مصطفى الخطيب - مياه | كرم عماد | عادي |
| 77 | W0002098 | ابراهيم منصور كراحة - مياه | الضاحية - 2 | عادي |
| 78 | W0001686 | ابراهيم منيزل عويضات - مياه | راس الظهرة | عادي |
| 79 | W0001243 | ابراهيم موسى الجهالين - مياه | الضاحية - 2 | عادي |
| 80 | W0001834 | ابراهيم موسى الجهالين / فوق - مياه | راس الظهرة | عادي |
| 81 | W0000935 | ابراهيم موسى زرعي - مياه | بروكه | عادي |
| 82 | W0003754 | ابراهيم موسى عبد الله سالم زعاتره | الضاحية - 2 | عادي |
| 83 | W0000401 | ابراهيم موسى فرعون / الزاوية - مياه | الشيخ احمد | عادي |
| 84 | W0000065 | ابراهيم موسى فرعون /وسط - مياه | قيسة | عادي |
| 85 | W0000066 | ابراهيم موسى فرعون/تحت - مياه | قيسة | عادي |
| 86 | W0000064 | ابراهيم موسى فرعون/ح - مياه | قيسة | عادي |
| 87 | W0000067 | ابراهيم موسى فرعون/علوي - مياه | قيسة | عادي |
| 88 | W0002522 | ابراهيم و سفيان قطميرة - مياه | الحلة | عادي |
| 89 | W0001821 | ابراهيم يعقوب حجازي - مياه | المشروع | عادي |
| 90 | W0000421 | ابراهيم يوسف الخطيب - مياه | مسطح القرية | عادي |



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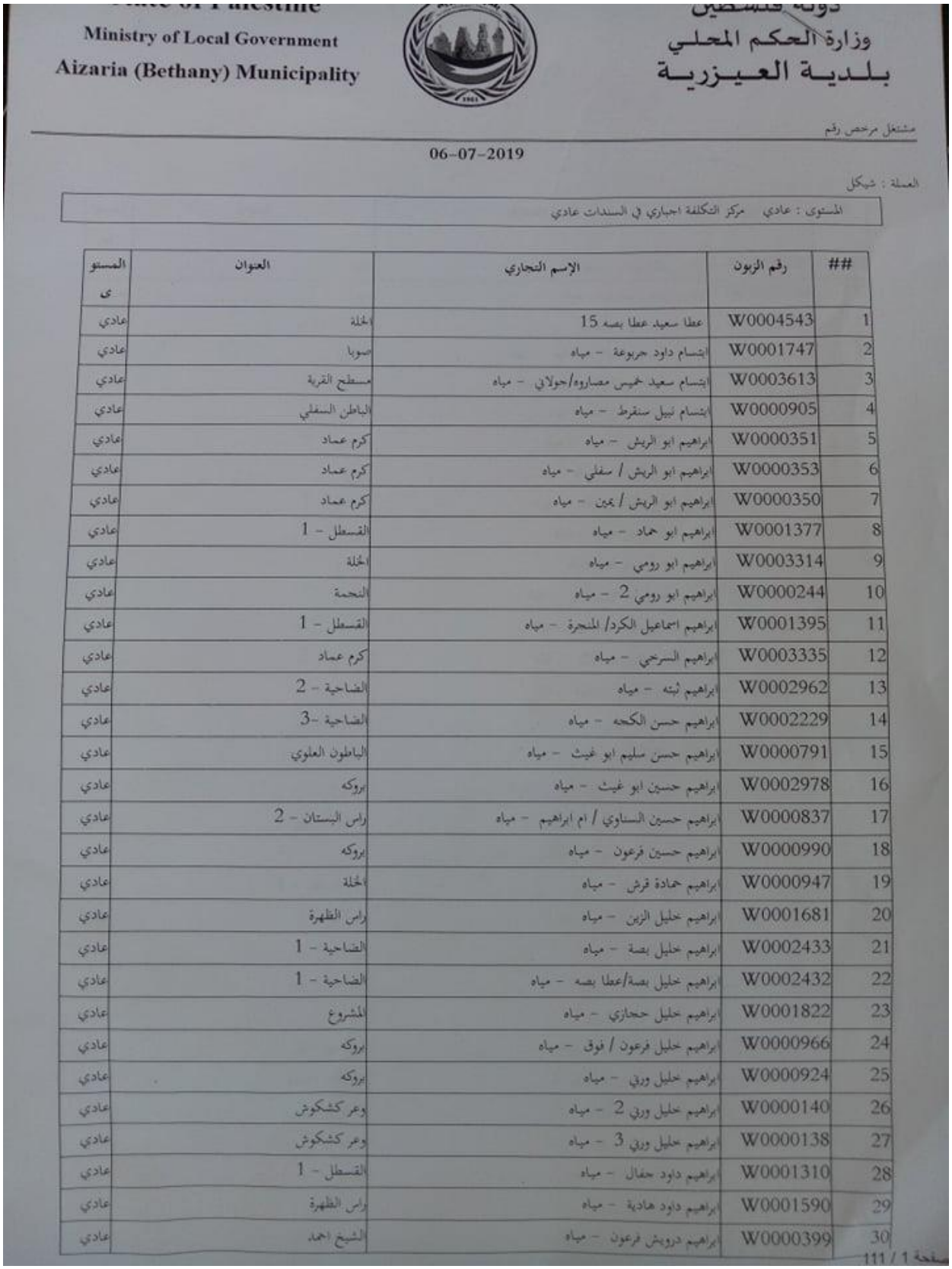
| ## | رقم الزبون | الإسم التجاري | العنوان | المستوى |
|---|---|---|---|---|
| 31 | W0001781 | ابراهيم رزق رمان - مياه | صوبا | عادي |
| 32 | W0001764 | ابراهيم رشيد حجازي - مياه | صوبا | عادي |
| 33 | W0003700 | ابراهيم سعيد ابو دعموس | الاسكان الجديد | عادي |
| 34 | W0003116 | ابراهيم سليمان سلمان ابو غاليه - مياه | المشروع | عادي |
| 35 | W0003074 | ابراهيم سليمان سويلم الجهالين - مياه | الضاحية - 1 | عادي |
| 36 | W0001983 | ابراهيم شعبان عوض الله - مياه | صلاح الدين | عادي |
| 37 | W0002080 | ابراهيم شكري ابو عصب - مياه | الضاحية - 1 | عادي |
| 38 | W0002912 | ابراهيم صالح العروم - مياه | المروج | عادي |
| 39 | W0001328 | ابراهيم صالح مصطفى رمان - مياه | القسطل - 1 | عادي |
| 40 | W0001765 | ابراهيم عبد الرحمن شريم - مياه | صوبا | عادي |
| 41 | W0004128 | ابراهيم عبد الرحيم محمد عياد | الشياح | عادي |
| 42 | W0000665 | ابراهيم عبد الله ابو سمري /ش - مياه | الخلة | عادي |
| 43 | W0000666 | ابراهيم عبد الله ابو سمري/ي - مياه | الخلة | عادي |
| 44 | W0003465 | ابراهيم عبد حضر ابو هلال - مياه | الضاحية - 2 | عادي |
| 45 | W0001300 | ابراهيم عبده الطويل - مياه | القسطل - 1 | عادي |
| 46 | W0003688 | ابراهيم عثمان حشيمي | الباطون العلوي | عادي |
| 47 | W0001871 | ابراهيم عثمان عواد - مياه | المشروع | عادي |
| 48 | W0001848 | ابراهيم عرابي محمد مسودة/جديد - مياه | المشروع | عادي |
| 49 | W0004467 | ابراهيم علي غيث | الباطن السفلي | عادي |
| 50 | W0000085 | ابراهيم علي محمد دمدوم - مياه | قبسة | عادي |
| 51 | W0000724 | ابراهيم عمر ابو زياد - مياه | راس البستان - 1 | عادي |
| 52 | W0003553 | ابراهيم عمر رشاد تميمي - مياه | الضاحية - 1 | عادي |
| 53 | W0000945 | ابراهيم عوده الزرعي - مياه | بروكه | عادي |
| 54 | W0004057 | ابراهيم عوض احمد عبد ربه | الضاحية - 1 | عادي |
| 55 | W0004080 | ابراهيم عوض احمد عبد ربه1 | النجمة | عادي |
| 56 | W0002154 | ابراهيم عيد عواد المرش - مياه | الضاحية - 2 | عادي |
| 57 | W0004417 | ابراهيم عيسى ياحس الشمالي | الاسكان الجديد | عادي |
| 58 | W0001825 | ابراهيم فواد زاده - مياه | المشروع | عادي |
| 59 | W0004387 | ابراهيم محمد ابراهيم منير | المروج | عادي |
| 60 | W0000931 | ابراهيم محمد ابو غنام - مياه | بروكه | عادي |



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المستوى : عادي  مركز التكلفة اجباري في السندات عادي

| ## | رقم الزبون | الإسم التجاري | العنوان | المستوى |
|---|---|---|---|---|
| 1 | W0004543 | عطا سعيد عطا بصه 15 | الخلة | عادي |
| 2 | W0001747 | ابتسام داود حربوعة - مياه | صوبا | عادي |
| 3 | W0003613 | ابتسام سعيد خميس مصاروه/حولاني - مياه | مسطح القرية | عادي |
| 4 | W0000905 | ابتسام نبيل سنقرط - مياه | الباطن السفلي | عادي |
| 5 | W0000351 | ابراهيم ابو الريش - مياه | كرم عماد | عادي |
| 6 | W0000353 | ابراهيم ابو الريش / سفلي - مياه | كرم عماد | عادي |
| 7 | W0000350 | ابراهيم ابو الريش / يمين - مياه | كرم عماد | عادي |
| 8 | W0001377 | ابراهيم ابو حماد - مياه | القسطل - 1 | عادي |
| 9 | W0003314 | ابراهيم ابو رومي - مياه | الخلة | عادي |
| 10 | W0000244 | ابراهيم ابو رومي 2 - مياه | النحمة | عادي |
| 11 | W0001395 | ابراهيم اسماعيل الكرد/ المنجرة - مياه | القسطل - 1 | عادي |
| 12 | W0003335 | ابراهيم السرحي - مياه | كرم عماد | عادي |
| 13 | W0002962 | ابراهيم ثبته - مياه | الضاحية - 2 | عادي |
| 14 | W0002229 | ابراهيم حسن الكحه - مياه | الضاحية -3 | عادي |
| 15 | W0000791 | ابراهيم حسن سليم ابو غيث - مياه | الباطون العلوي | عادي |
| 16 | W0002978 | ابراهيم حسين ابو غيث - مياه | بروكه | عادي |
| 17 | W0000837 | ابراهيم حسين السناوي / ام ابراهيم - مياه | راس البستان - 2 | عادي |
| 18 | W0000990 | ابراهيم حسين فرعون - مياه | بروكه | عادي |
| 19 | W0000947 | ابراهيم حمادة قرش - مياه | الخلة | عادي |
| 20 | W0001681 | ابراهيم خليل الزين - مياه | راس الظهرة | عادي |
| 21 | W0002433 | ابراهيم خليل بصة - مياه | الضاحية - 1 | عادي |
| 22 | W0002432 | ابراهيم خليل بصة/عطا بصه - مياه | الضاحية - 1 | عادي |
| 23 | W0001822 | ابراهيم خليل حجازي - مياه | المشروع | عادي |
| 24 | W0000966 | ابراهيم خليل فرعون / فوق - مياه | بروكه | عادي |
| 25 | W0000924 | ابراهيم خليل ورني - مياه | بروكه | عادي |
| 26 | W0000140 | ابراهيم خليل ورني 2 - مياه | وعر كشكوش | عادي |
| 27 | W0000138 | ابراهيم خليل ورني 3 - مياه | وعر كشكوش | عادي |
| 28 | W0001310 | ابراهيم داود حمال - مياه | القسطل - 1 | عادي |
| 29 | W0001590 | ابراهيم داود هادية - مياه | راس الظهرة | عادي |
| 30 | W0000399 | ابراهيم درويش فرعون - مياه | الشيخ احمد | عادي |

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المستوى : تجاري مركز التكلفة اجباري في السندات تجاري

| ## | رقم الزبون | الإسم التجاري | العنوان | المستوى |
|---|---|---|---|---|
| 1 | W0003014 | يوسف محمد علي دعيس - مياه | الضاحية -3 | تجاري |
| 2 | W0003984 | وائل محمد داود نتشه | النجمة | تجاري |
| 3 | W0004519 | مؤمن عبد الحميد محمد ابو عرفه | النجمة | تجاري |
| 4 | W0003944 | موسى ربيع حسين فرعون | كرم عماد | تجاري |
| 5 | W0003705 | محمود محمد المصلوحي | مسطح القرية | تجاري |
| 6 | W0003439 | محمد يونس شقيرات - مياه | الضاحية - 2 | تجاري |
| 7 | W0003448 | محمد حسن ابراهيم ابو حلوه 2 - مياه | كرم عماد | تجاري |
| 8 | W0004579 | محمد احمد محمد المشاهره | المشروع | تجاري |
| 9 | W0002382 | ماهر و طاهر حسن فرحان ابو سعد - مياه | الضاحية - 2 | تجاري |
| 10 | W0004413 | عيسى حسين محمد الخطيب 1 | النجمة | تجاري |
| 11 | W0001083 | عماد عطا محمد فرعون - مياه | المروج | تجاري |
| 12 | W0003906 | عبد المنعم حسين توفيق الشويكي | صلاح الدين | تجاري |
| 13 | W0003854 | عبد القادر فوزي عبد القادر الجعبري | صلاح الدين | تجاري |
| 14 | W0001239 | شركة سنيورة للصناعات الغذائيه م - مياه | الاسكان الجديد | تجاري |
| 15 | W0004374 | سليمان احمد ابراهيم محسن 1 | الضاحية - 2 | تجاري |
| 16 | W0002097 | سعيد بدر الزماعرة - مياه | الضاحية - 2 | تجاري |
| 17 | W0003440 | رائد ابراهيم ابو ادهيم - مياه | الضاحية - 2 | تجاري |
| 18 | W0002163 | خضر احمد ابو ماضي - مياه | الضاحية - 2 | تجاري |
| 19 | W0003772 | خالد علي محمد قريع | كرم عماد | تجاري |
| 20 | W0000186 | حكم زكي علي ابو زعرور/شومان - مياه | النجمة | تجاري |
| 21 | W0003764 | حسين ربيع حسين فرعون | مسطح القرية | تجاري |
| 22 | W0004043 | حسام جمال يوسف طه | الضاحية - 1 | تجاري |
| 23 | W0001988 | جمعة قرش /سليمان - مياه | صلاح الدين | تجاري |
| 24 | W0000043 | جمال محمد خليل ابو دعموس - مياه | راس البستان - 2 | تجاري |
| 25 | W0003814 | بلال عمر عبد المنعم المحتسب 2 | الضاحية - 2 | تجاري |
| 26 | W0003813 | بلال عمر عبد المنعم المحتسب | الضاحية - 2 | تجاري |
| 27 | W0003593 | بلال زهير عبدو ابو عيشة - مياه | النجمة | تجاري |
| 28 | W0004586 | البنك الوطني | راس الظهرة | تجاري |
| 29 | W0003942 | اشرف عمر حمدان القنبر | صلاح الدين | تجاري |
| 30 | W0003667 | احمد موسى احمد الخطيب - مياه | قيسة/مجمع بوابة القدس | تجاري |

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