COST RECOVERY
and DEMAND MANAGEMENT IN LEBANESE WATER SECTOR

Title: Cost recovery and demand management in Lebanese water sector.

Within the framework of the project financed by the European Union *"Improving access to water and sanitation services in hosting communities affected by the Syrian crisis in the North Bekaa Valley"*

"The contents of this publication are the sole responsibility of GVC and can in no way be taken to reflect the views of the European Union"

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I. Executive Summary

This research on cost recovery and demand management in the sector of water in Lebanon was realized within the framework of the European Union project *«Improving access to water and sanitation services in hosting communities affected by the Syrian Crisis in the North Bekaa Valley»* and was led by the Italian NGO GVC, from September 2014 to May 2016. It focuses on water challenges, while dealing with certain aspects of sanitation, and – to a lesser extent – solid waste management, all these sectors being intimately linked.

The main objective of the research is to identify possible ways forward for the sector to implement better cost recovery and demand management measures as indicated in the Lebanese National Water Strategy. To this end, the study is articulated around three main parts:

- A literature review from 2000s (date of promulgation of Law 221 which reorganized the whole structure of the sector) onward;
- A survey gathering the points of view of main actors in the sector (Water Establishments, Ministry of Energy and Water, Council for Development and Reconstruction, donors, academics and experts) based on semi-structured interviews;
- A household survey collecting customer opinions from five municipalities from North Bekaa chosen within the project field of intervention.

Even if access to water is theoretically considered to be fully achieved in urban areas and quite satisfactory in rural ones (where 85% of people are considered to receive water through piped systems), gathered opinions revealed mixed results. The level of public services delivery is poor, both for water and sanitation, and does not match the level of economic development reached by the country, both in quantitative and qualitative terms. Although the data remains vague due to the lack of monitoring, the situation is alarming especially in the Bekaa Valley. For instance, 75% of surveyed people connected to the network declared not being satisfied at all with the quality and reliability of the service.

A large range of stakeholders is involved with more or less a specific roles and it is difficult to have a clear view of the distribution of powers and responsibilities among them. Whereas Water Establishments are theoretically in charge of water and sanitation in Lebanon, Municipalities still play a key role (like maintenance and extension) and are perceived most of the time by the citizens/customers as the preferred intermediary. The evolution of the legal framework since the beginning of the 2000s through the Law 221, the National Water sector Strategy and the Water Code Project aims to clarify the situation, but it is not applied. The situation is quite alarming and Lebanese have therefore to find alternative water resources (private wells, water trucking, bottled water, etc.).

Public water sector in Lebanon is characterized by irregular standards of service and low rates of payment by citizens. The majority of main actors think that there is no strategy at all for cost recovery or consider it inefficient when existing. There are few examples of cost recovery experiences but no real substantial capitalized pilot project for replication. The limited capacity of Water Establishments in setting adequate demand management measures and applying good measures for cost recovery make them unable to provide a reliable service. Moreover, the limited application by the central government of the reform of the sector and the adverse attitude of the citizens/customers toward public institutions are current obstacles to breaking the vicious circle. The lack of trust between customers and institutions, and among institutions themselves, political interferences and external factors like the influx of Syrian refugees affect the whole sector.

In this day and age, Water Establishments do not have proper data to calculate the real production cost per cubic meter. Tariffs do not represent the total cost of the service and seem to take into consideration only

operation and maintenance costs, not capital/production costs. At the same time, the actual fee incurred by private households is 2-3 times higher than they would be supposed to pay in case of a reliable public service. The alternatives in rural areas are too expensive to be really competitive with the public service. Actually, the tariff is not based on consumption: only 4% of households had water meter installed in 2009 (World Bank 2009). According to the customer study, 91% of people are in favor of the introduction of water meters and 85% declare that they could be useful for improving management. The large majority of main actors think that wastewater tariff should also be calculated as a proportion of consumed water. It would be a win-win situation for both institutions and citizens/customers, especially ones who have low consumption of water.

Beyond water tariff, low subscription rates and low payments rates are common to most of Water Establishments (at least in Bekaa, the North and the South). This is mainly due to a vicious cycle fomented by the low quality of service provided, the lack of trust in public sector, the incapacity to enforce the law and the wide spread of illegal connections. At the same time, the survey reveals that the willingness to pay is quite high and 90% of citizens/customers are ready to pay more but only for a reliable service. The estimated average acceptable value is 31.730 LBP/month (approx. 20 USD) for a minimal but reliable service. Reliability indeed remains the most important criteria for customers whose expectations are finally minimal in terms of public service: 65% of them expected only 2 hours per day of service from the network. Furthermore, and beyond reliability, the sustainability of the service is a key challenge.

The survey confirms also that actual water consumption per capita is on average very high (approx. 145 l/pers/day) even when public services are not reliable and costs alternative suppliers much higher. Measures to limit the demand and awareness campaigns for water conservation are necessary not only to improve technical performances of water schemes (and possibly reach 24h service) but also for environmental reasons in order to preserve limited water resources.

Different measures are recommended by different stakeholders in order to improve the service and ensure better standards. As for cost recovery, it is recommended at the Water Establishment management level, to work on metering demand, applying volumetric tariff, improving production and distribution cost knowledge, and enhancing the application of business plan approach. Supporting the enforcement of law and promoting the independency of the sector from external political interferences are also of prime importance. It is deemed important as well to adapt the investment strategy; i.e. to properly balance the infrastructural investment (construction and rehabilitation) with adequate investments in order to ensure proper operation and maintenance by Water Establishments.

As recommended by many actors, all of this should be done in collaboration with all stakeholders, including public ones like Municipalities and Unions of Municipalities, but above all with customers themselves. Citizens have to be better involved and included in the decisional process from the beginning. There is a clear need of awareness on various themes. As regards paying water services, it is fundamental to focus on citizens' real concerns and let them visualize the economic advantages of using public water services instead of alternative sources. Customers should be aware about the different aspects that may affect water quality. Furthermore, a mutual social control among customers is essential in order to identify and stigmatize illegal connections and water wastage. This cultural change can be promoted with awareness campaigns, the reinforcement of civil society and a simultaneous improvement of transparency and communication at the management level. It could also be helped by the introduction of reliable customer services in the water sector.

Even though the customer survey only concerns a part of the Bekaa, the lessons learned could be applied in all the regions and taken into consideration, at the same level as the findings from literature review and main actors' survey, with a view to promote a deep and constructive debate in the sector in order to achieve best practices in cost recovery and demand management.

As different parts compose the study, it was not possible to include all the findings in a summary. If you want to have a quick understanding of the most important findings of the study, please refer to the parts highlighted in the table of contents

II. Acknowledgements

For Citizens/Customers' survey

The citizens/customers' survey has been conducted by the Italian NGO GVC, within the framework of the European Union financed project "Improving access to water and sanitation services in hosting communities affected by the Syrian crisis in the North Bekaa Valley" (ENPI/2014/342-913)

Different GVC staffs have contributed to the execution of the survey from conception phase up to fieldwork activities, analysis of data and revision:

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For main actors survey

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III. Acronym List

BWE : Bekaa Water Establishment
CDR : Council for Development and Reconstruction
EBML : Beirut Mount Lebanon Water Establishment
GDP : Gross Domestic Product
HH : Household
LPB : Lebanese Pound
MoEW : Ministry of Energy and Water
NLWE : North Lebanon Water Establishment
NWSS : National Water Sector Strategy
PCPD : Litter Consumed Per Day
SLWE : South Lebanon Water Establishment
UFW : Unaccounted For Water
WTP : Willingness To Pay or Water Treatment Plant

Reminder:

During the report, this color code is used in the graphs to identify the different main actors.

Group Membership	No. of Actors
CDR	3
Donor	8
Establishment	7
Expert	10
MOEW	5
Academic	3
	36

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PART I

PRESENTATION OF THE RESEARCH AND LITERATURE REVIEW

1.1 INTRODUCTION

1.1.1 Background

The research has been realized within the framework of the **European Union** financed project *"Improving access to water and sanitation services in hosting communities affected by the Syrian crisis in the North Bekaa Valley",* implemented by the Italian NGO **GVC**.

The project, implemented in collaboration with the Bekaa Water Establishment (BWE), aimed to improve water infrastructures in three rural municipalities of North Bekaa and to improve water demand management and cost recovery through awareness promotion and household water meters installation and follow-up.

The research work started on September 2014 with an extensive literature review, followed by the preparation of the survey and of the interviews forms between October and November 2014. The field survey was conducted from December 2014 to February 2015, while the interviews with the main actors in the water sector lasted from January to May 2015. The analysis of data and the study were finalized in May 2016.

The citizens/customers' survey was conducted in 5 rural Municipalities of North Bekaa (Bejjeje, Zabboud, Ain, Nabi Osmane and Labwe), three of which also targeted by the EU project. The stakeholder's survey was conducted in Beyrouth and XXX.

The research is articulated in 3 parts:

1. Literature review starting from year 2000 when law 221, redefying the whole structure of the sector, has been promulgated;
2. Semi-structures interviews with main actors of Lebanese water sector (list of interviews : see below 2.1.3);
3. Households' survey to collect citizens' opinions about public services related to water sector.

The three parts are presented as different volumes that can be also consulted separately. Nevertheless, the conclusions are strictly interconnected between each part of the research.

The terms citizens/customers are reported together in the research in order to stress the important difference between citizen, as owner of the right to receive reliable public services, and customers, as owner of the duty to pay for the service purchased.

1.1.2 Context

Public water sector in Lebanon is characterized by irregular standards of service and low rates of payment by citizens.

The general approach applied by public authorities is addressed in developing infrastructural components to increase water production instead than investing in **water demand management** - *so putting in place activities in support of control of the demand, estimating its volume, and planning the production accordingly* (with consequent positive repercussion also on national water resources).

Objectives regarding water demand management, in particular introduction of water meters and application of related volumetric tariff, are mentioned in National Water Strategy but remained practically unapplied up to date because of political bureaucracy, lack of specific managerial practices and lack of customer involvement in the whole process.

Regarding provision of public services, the population is not consulted in any phase of the process and too often it is perceived just as the final consumer that should pay, independently from the quality of the service providexd.

This research is aiming to collect opinions from the different main actors in the water sector to identify a possible strategy to overcome the actual problem related to **cost recovery** - *approach to recover expenditures linked to water production, distribution and maintenance* - of public water services in Lebanon and to define the involvement of various stakeholders in achieving it.

GVC research has been focusing in testing a particular survey methodology that, if accompanied by improvement in water infrastructure and in the management of the service, performed within the EU funded Project, could facilitate among the final customers the application of water demand management good practices and improve cost recovery.

This study is focusing on water but will deal with certain aspects of sanitation, and – to a lesser extent – solid waste management, when is relevant, these sectors being intimately linked.

1.1.3 Structure of the Research

The research is composed by 4 main parts

- **Part 1 – INTRODUCTION AND LITERATURE REVIEW**

  Introduction - General introduction about the whole research.

  Overview of Lebanese water sector - The objective of this chapter is to provide brief information about general aspects of Lebanese water sector in order to better understand the context and to highlight some of the aspects that will be relevant at a later stage for the research.

  Literature review - A quite extensive literature has been reported focusing on cost recovery and participation of final users in water sector in Lebanon. The literature review has been essential for identifying the gaps in the sector and to define the objectives and the methodology of the research. From literature review questions for the two other parts of the research have been developed.

  Research methodology - This chapter illustrates how the total study has been conceived, structured and implemented and how the topics of the research have been formulated starting from the literature review.

- **Part 2 – MAIN ACTORS' SURVEY**

  Main Actors Survey preparation and methodology - This chapter illustrates how the interviews with the main actors have been conceived, structured and implemented.

  Analysis of data from interviews - The survey is presented in detail in this chapter with graphs and analysis of all the material collected. The sections of this chapter reflect the sections present in the semi-structured questionnaire used for the interviews.

  Summary of findings from Main Actors Survey - The findings from main actors survey are analyzed in relation to the objectives of the research previously described.

- **Part 3 – CITIZENS/CUSTOMERS' SURVEY**

  Citizens/Customers' Survey preparation and methodology - This chapter illustrates how the field survey has been conceived, structured and implemented.

  Analysis of data from field survey - The field survey is presented in detail in this chapter with graphs and analysis of all the material collected. The sections of this chapter reflect the sections present in the field questionnaire.

  Summary of findings for Citizens/Customers' Survey - The main findings from the field survey are analyzed in relation to the objectives of the research previously described.

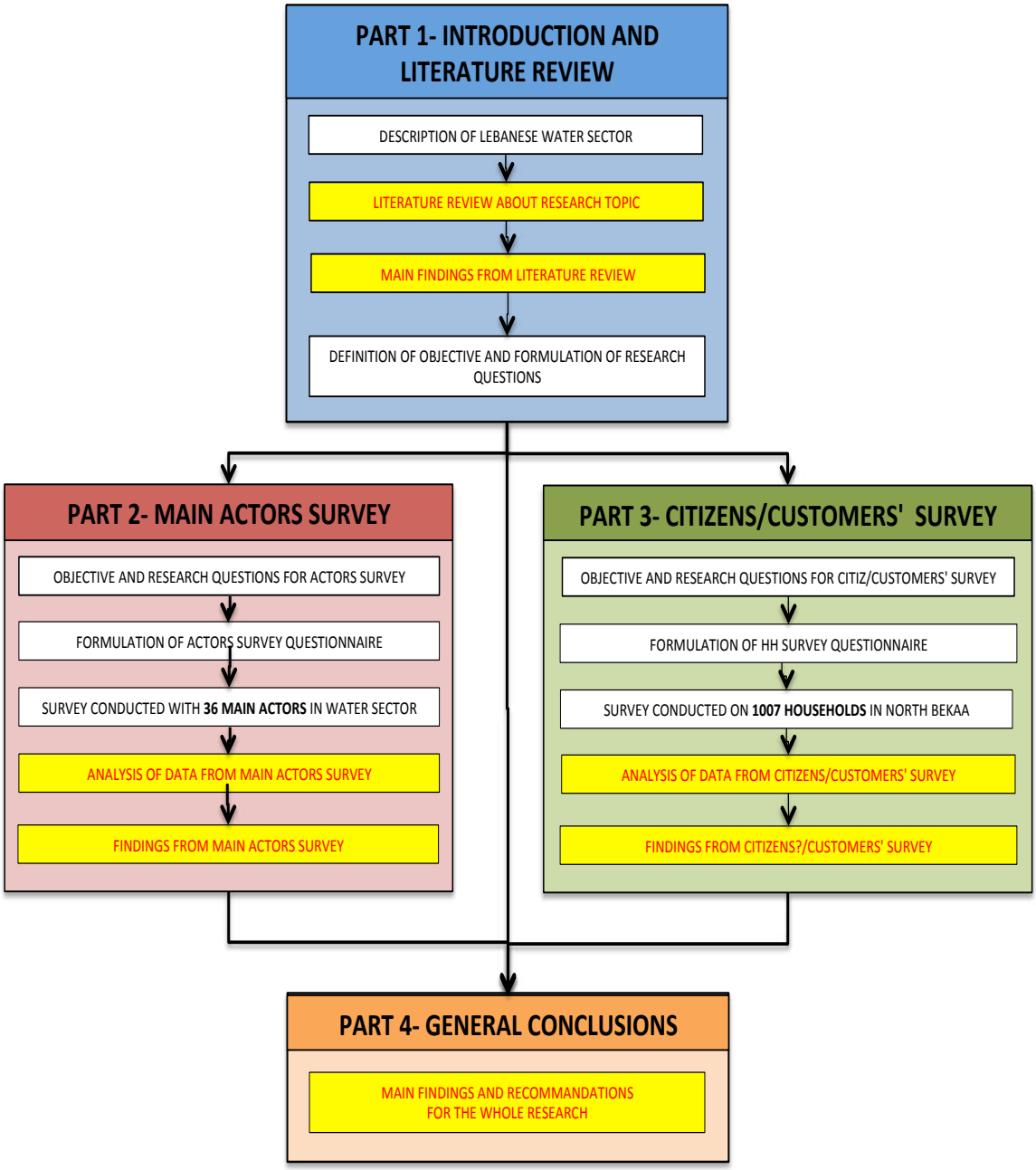
- **Part 4 – GENERAL CONCLUSIONS**

  The findings for the whole research are summarized in this chapter and recommendations for future actions are provided.

- **ANNEXES**

- **BIBLIOGRAPHY**

The parts of the research are related between them upon the scheme presented here below.



The findings of this research are extracted from a long work of surveying and analysis that is presented especially in part 2 and part 3 of the research.
It is recommended to have at least a quick look to all the parts marked in yellow in this scheme in order to properly appreciate the findings presented in part 4.

1.2 OVERVIEW OF LEBANESE WATER SECTOR

This chapter is presenting a description of the Lebanese water sector in order to provide concise information for better understanding the context of the research.

Many publications are present in literature that cover more than extensively all related aspects of water management in Lebanon and all its institutional aspects.

It is no intention of the research to describe in details the whole Water sector in Lebanon, and related Water Legislation, but only to present those aspects that are relevant for the results of the research have been presented with more details.

1.2.1 General features

Lebanon is a Country with a total surface of 10,452 km2 and a resident population estimated in 4,5 millions of habitants (including approximately 450.000 refugees in year 2010) with an estimated growth rate between 1,5 and 2,5% (MoEW 2012).

The influx of 1,5 millions Syrian Refugees during the last 4 years has brought the total population to approximately 5,9 millions of habitants (UNHCR 2016).

The country ranges has a upper middle income country (UNDP 2014d) with an increasing GDP per capita of around 9.928 USD (WORLD BANK 2014a) an HDI (Human Development Index) of 0,765 ranking 65th out of 187 Countries and with general indicators above the average of other MENA countries.

If Human Development Indicator is discounted with Inequality Index, Lebanon HDI falls to 0,606 (a loss of around 20%) showing that inequality of income and in access to services between population are a relevant problem in this Country (UNDP 2014).

Most of the population (87%) resides in urban areas (SOGESID 2005) while the remaining 13% is spread in rural areas characterized by small size municipalities.

The history of Lebanon, since the drawing of its constitution in 1926 has always been characterized by religious segregations that are also reflected in the political structure of the Country with a special repartition of institutional charges upon different religious groups.

Recent history of Lebanon has been characterized by a civil war that has paralyzed the Country for approximately 15 years (1975-1990), destroyed most of its existing infrastructures, and left and unresolved social and religious conflict still evident in the present Lebanese society.

The war also caused major demographical changes (emigration and internal rural-urban migration) that for some researchers explains why the reconstruction process has been consolidating with a geographic segregation approach (Darwish 2004)(Alles 2010).

The process of recovery launched after the civil war has been affected by an ulterior war with Israel in 2006 where a large number of Lebanon infrastructures have been destroyed.

Segregation among citizens can still be considered as characterizing modern Lebanese society. This has also been confirmed by a recent survey conducted on the population of 44 Countries (PEW Research Center 2014) where “religious and ethnic hatred” has been ranked as the greatest danger perceived by Lebanese population (58%) against a world average of 21%. (scoring even higher than occupied Palestinian territories - 40%).

The same survey shows also that Lebanon population has the worst environmental concern in the world (3% against a world average of 17%).

1.2.1.1 People with access to water and sanitation

Access to water and sanitation through domestic piped system is considered fully achieved in urban areas (100%) while in rural areas an 85% of population is considered to receive water through piped system in the premises and the remaining 15% to have access to water through other improved means (WHO/UNICEF 2014).

Different data from other documents estimate the values of households connected to public networks ranging from only 53,3%) (ESCWA 2012) to values up to 79% for the whole country as an average but with important discrepancies at regional level (UNDP 2014b; Klawitter & Qazzaz 2005).

A common point in different studies is the agreement about poor standards of public services delivered and that the state of water supply and sanitation sector in Lebanon is not in line with the level of economic development reached by the country (WORLD BANK 2010) especially in relation to other MENA countries.

More than 80% of surveyed households rate between poor and intermediate the level of satisfaction in relation to water needs especially in terms of quantity and quality (Darwish 2004).

In relation to quality of water, up to 70% of sources are chlorinated but, even where chlorination units are functional, secondary and tertiary networks are deteriorated (Klawitter & Qazzaz 2005).

52% of inhabitants never drink water from the public network and only 49% of urban Households get water every day in winter (value that decreases down to 29% in summer) while around 40% receive water only 1 or 2 times per week all along the year (CORAIL & IPSOS 2004).

A correlation can also be identified between connection to the public network and geographic location (WORLD BANK 2009). Differences in the level of service are evident between regions, between different areas in the same region but also between different quarters in the same cities (WORLD BANK 2012). The worst situations appear to be in the city of Beirut and in Bekaa region where the average hours of water supply reach respectively 3 and 5 hours per day during summer period (WORLD BANK 2009).

Assuming a general poor level of service all around the country, these additional “differences in service are considered not a result in technical hazards but a revelator of socio-economical discrepancies, and the product of political regulations regarding the provision of water” (Verdeil 2008).

Shortage of water supply further triggered the development of an informal private sector providing alternative and practically completely uncontrolled informal water supply through private wells, bottled water and water trucks, often at a higher cost and lower quality than public network water (WORLD BANK 2013). Same consideration can be done also for the Electrical Sector (other public service considered as poorly performing) that is characterized by similar patterns in relation to uneven rationing (WORLD BANK 2009) showing geographical and social inequalities in the service provision (Verdeil 2008).

Upon UN Joint Monitoring Program, the access to improved services in sanitation sector is considered as universal in urban areas while only 13% of population in rural areas is still not connected through an improved sanitation system (WHO/UNICEF 2014).

In 2007 wastewater network coverage was around 66%, with only 8% of the total wastewater treated before being released in the environment (MoEW 2012) while the remaining households were equipped with septic tanks. Experience from the field shows that in reality most of the pits cannot be considered as septic because they are not sealed pits and allow contamination of groundwater.

Also the number of connections to wastewater networks shows important differences between regions and Establishments, with the lowest value detained by Bekaa with only 49,3% of households connected (UNDP 2014).

The average national expenditure in the water sector is usually 0,4% of national GDP while the opportunity costs of inadequate public water supply provision has been estimated at 1,3% of GDP every year.

The environmental degradation caused by the discharge of untreated wastewater is estimated to cost an additional 1% of GDP every year (WORLD BANK 2010).

1.2.1.2 Water resources and water demand

Lebanon has for long time been considered as the “Chateau d’eau de l’Orient” (Kunigk 1999) because of its abundance of water in relation to the situation of scarcity present in most of other Middle East Countries.

Total potential water resources are estimated in a range between 2400 to 2700 Mm3 per year with a contribution of around 80% provided by surface water and the remaining 20% by groundwater (500 Mm3/year).

The total net exploitable water is instead estimated in around 2000 Mm3/year (El Fadel et al. 2001).

This quantity corresponds to an average of 926 m3/year (MoEW 2012) of available water resources per capita that is almost 10 times the available quantity per capita of other MENA neighboring countries like Jordan, Palestine or Yemen (Gerlach 2011).

The total quantity supplied in 2010 was estimated in 1400 Mm3/year originated by surface water (46% - 650 Mm3/y), groundwater (51% - 700 Mm3/y) and storage (only 3% - 45 Mm3/year).

The actual capacity to exploit surface resources as mentioned in the National Water Strategy is limited because of lack of proper infrastructures and the objective is to reach 700 Mm3 by year 2020 and around 1200-1300 Mm3/year in 2035 with important infrastructural projects (especially dams).

Groundwater instead has been overexploited in the recent years with an estimated extraction of around 700 Mm3/year (public and private wells) that the National strategy is aiming to reduce to the sustainable quantity of 500 Mm3/year by 2025 (MoEW 2012).

Different studies have shown that the alleged abundance of water resources of Lebanon will not be probably sufficient to cover future demand unless proper policies for management of demand and distribution will not be implemented (El Fadel et al. 2001).

The current demand of water, estimated in around 1500-1600 Mm3/year in 2010 (ESCWA 2012), and partially unattended for actual supply constraints, will steadily increase up to a quantity that can range between an optimistic 1800 Mm3/y to a possible value of 2500 Mm3/y (MoEW 2012).

This last value in particular is largely overtaking possible renewable water resources of the Country.

Recent influx of refugees from Syrian conflict (approx. 1,5 million people at December 2014 (UNHCR 2015) have contributed to accelerate this already existent rise of water demand and consequent depletion of the resources. The expected water demand for Syrian Refugees at the end of 2014 ranges between 43 to 70 Mm3/year corresponding to an increase between 8 to 12% of the actual demand (UNDP 2014c).

This demand will be mainly satisfied recurring to groundwater extraction (often unregulated) worsening the estimated unbalance of 200 Mm3/year already identified in the National Water Strategy before the Syrian crisis.

1.2.1.3 Limitations of water sector data and monitoring

Data availability in water sector is generally considered as very poor in Lebanon. Lack of reliable and consistent data are often mentioned as one of the main problem in whatever report and publication is produced about water sector in Lebanon. This problem of collection and consistency of data is common to almost all MENA countries where data related to water resource management are based on short term, ad hoc data with little proof of reliability and comparability (ESCWA 2009).

This deficiency in Lebanon is mainly due to fragmentation of the sector (ESCWA 2012) and low investment in proper data collection.

Deficiencies in meteorological and hydrogeological monitoring, basin characteristics as well as a lack of data on water demand do not allow the use of advanced methods of water resources monitoring though advanced technology. The civil war from 1975 to 1990 worsened the situation as it obstructed data collection for a long period as all the monitoring was suspended during that period (Krogerus 2010) and all the sectors have been for a long period neglected and almost deregulated.

1.2.1.4 Actual water and sanitation systems and tariff

Regarding water, as we will see later, not all the people is connected to the public network, the other ones use wells, water trucking or other alternatives. Most of the time, people combine different sources of water. Water is stocked on private storage cistern when people receive it from the network (there is not a continuous supply) and/or when they buy it from the suppliers.

For households connected to the public network, the price is fixed. Each household has to pay each year a fee of around 230,000 LBP (approx 150 USD) to the Water Establishment for 1m3 of water per day. Therefore, it doesn't concern people using wells, water trucking or other alternatives, either the households receiving water operated by local committee (see below)

Regarding sanitation, and since 2012, each household subscribing to the Water Establishment has to pay a tax, fixed price, average of 10.000 LBP per year if it is not connected to a functional treatment plant, or an average of 20.000 LBP if it is connected to a functional one (The average are calculated for BWE, NLWE and SLWE).

This fee is very low and above all only affects people subscribing to the Water Establishment and paying their fees. Cost recovery is both water and sanitation challenges is Lebanon.

1.2.2 Lebanon water sector institutional framework

1.2.2.1 Introduction about recent changes

Most of the legal framework of the water sector is coming from laws and regulations established in 1925, during French mandate (Darwish 2004).

Major improvements, especially in relation to re-organization and creation of regional authorities to substitute local authorities in the management of infrastructures and water resources, have been planned since the Seventies, but war outbreak interrupted whatever policy change. The fifteen years of civil war have been accentuating a process of parceling of the management of water resources and de-regulation of the whole sector as central Government authority was not present or able to reach most of the areas of the Country (Catafago 2005).

This process, especially for rural areas of the Country, has been consolidating the power of local committees or private exploitation of water resources, as public services were not guaranteed any more in those areas.

The law 221/2000 constituted a major step toward restructuring Lebanese water and sanitation sector even if for many years it has remained unapplied because lack of promulgation of related bye-laws (WORLD BANK 2012).

The National Water Sector Strategy (2012) can be considered as the reference document for the application of law 221 and tried to specify the directions and the targets to be achieved within a time bound framework.

1.2.2.2 Law 221/2000

The Law based on the principles of IWRM, “has laid the foundation for reforming the water sector based on the principle of delegated service provision and financial autonomy” (WORLD BANK 2010).

4 Regional Authorities (initially 5 then reduced) plus the Litani river Authority have been created with the objective to separate general level of management from lower level and to promote decentralization policies through regional consolidation of service provision under efficiency criteria related to economies of scale (ACWUA 2013b).

Even if institutional actors have defined the creation of 4 Establishment as a process of decentralization, some critics pointed out that in reality this can be considered instead as a process of re-appropriation of the water services by the central Government authority face to the pre-existing 21 Water Authorities and 209 local committees responsible for operation and maintenance of water supply infrastructures (Alles & Brochier-Puig 2014).

A following law (228/2001) establishes the principles for private sector participation in the water sector and encourages the Establishment to adopt commercial principles in their management (SOGESID 2005). This aspect of the reform, the participation of private sector in public services, still controversial in the national debate and still not fully applied in the water sector (apart from a single experience in the city of Tripoli, has been considered by some critics as an imposition of external donors that at that time were financing the rehabilitation and upgrading of the water sector after the Civil War (Alles 2012).

The supposed administrative and financial autonomy proposed with the law in reality has shown to be very weak as the 4 Establishments were not provided by the Ministry with the necessary resources (human and financial) to operate as autonomous entities.

A limit of law 221 has also been the incapacity to tackle the fragmentation of responsibility in planning and executing investments between Council for Development and Reconstruction (CDR) responsible for externally-financed investments, Ministry of Energy and Water (MoEW) responsible for investments

financed by internal budget and new Authorities responsible for small investments financed by operational revenues (GWP-Med & OECD 2010) (Touzi & GWP-Med 2011).

1.2.2.3 National Water Sector Strategy (NWSS)

National stakeholders (Ministries, Establishments, International Donors and NGOs) and formally approved in 2012 with the overall objective "to ensure water supply, irrigation and sanitation services throughout Lebanon on a continuous basis and at optimal service levels, with a commitment to environmental, economic and social sustainability" (WORLD BANK 2012).

Among the many points touched by the Strategy for re-organizing the water and wastewater sector and setting the targets for the coming 25 years the most relevant can be considered (ACWUA 2013b):

- Optimize the utilization of water resources (surface and groundwater);
- Extension of existing water network coverage;
- Promotion of a water demand management approach through installation of water meters;
- Restructuring tariffs for water and wastewater sector;
- Reconsider organization of structures of MoEW and Water Establishments encouraging planning in the sector, business plans and setting performance indicators;
- Preparing the sector for the participation of the private sector.

The publication of the strategy has been an important step forward for the development of the water sector in Lebanon and constitutes an important reference for the different actors but its implementation is facing some important constraints (WORLD BANK 2012):

- **Accountability constraints -** Internal and external accountability of the sector are a problem in Lebanon. In order to achieve reforms It is required a political support much larger than only from the water sector.
- **Financial constraints -** The real capacity of investment of the Government (including Donors support) is much lower than the one optimistically planned for achieving the objectives of the strategy (US$ 1 billion per year) consisting of 2% of annual GDP, for the period 2011-2015. The average expenditure is usually 0,5% of GDP (WORLD BANK 2010).

  The assumption that from 2015 the cost recovery will double and cover all operation and maintenance costs (and full recovery by 2021) is considered completely unrealistic.
- **Implementation capacity constraints -** The institutional weaknesses and actual limitations in capacity because of shortage of staff require numerous measures to be taken, most of them demanding real political commitment and more gradual approach.
- **Political Economic constraints -** "Worldwide best practice in reform implementation is to initiate broad dialogue and outreach to increase ownership of the reform program". This has been always a problem in the implementation of past sector reform. A complete change of attitude in the promotion of the NWSS is necessary for its success.

1.2.2.4 The National Water Code/ "Code de l'eau"

The need of a modern water code has been under discussion for long time in Lebanon because of an existing regulatory framework fragmented among old juridical norms, from different legislative codes, and different uses and costumes that have been coexisting in the Country since long time (CORAIL & IPSOS 2004).

Upon National Water Strategy the main issues that should be present in the code are:

- Recognition of the main legal principles prevailing actually in the water sector and between these the clear definition of the "right to each citizen to receive water";

- Introduction of a National Water Council;
- Implementation of a Water master plan;
- Determination of the utilization of water including the legal possibilities to Private Sector Participation.

All the activities and resources required to put in place these goals should be treated in this Code.

A first draft has been elaborated with the support of AFD (French Development Agency), but still not approved neither published. The approval and its publication is mentioned as one of the objectives to be achieved in the National Strategy.

The fact that the approval has not been achieved 3 years after the publication of the National Strategy (and more than 10 years after the preparation of the draft) shows a certain lack of political commitment to directly address the challenges of this sector beyond the actual unfavorable political context in the country.

This lack of political commitment, “in an institutional context characterized by weak accountability between policy-makers and service providers risks that the water code, once approved, will become an additional institutional layer with limited leeway to improve sector coordination and align incentives” (WORLD BANK 2010)

1.2.3 Institutional actors

1.2.3.1 Ministry of Energy and Water (MoEW)

It is the central public organization in charge of competences in the field of water in Lebanon (EMWIS 2015).

Between the 3 existing General Directions, only two are directly involved with water sector:

- Direction of Hydraulic and Electric Resources with the functions of:
  - Planning and studying hydraulic projects, implement them and supervise them
  - Apply laws and regulations relative to the protection of public water and its exploitation
- Direction of Exploitation with the function to:
  - Exercise power of tutelage on the public establishments (Water Authorities) and ensure administrative and financial control of them
  - Study complaints and measurement necessary to regulate the infringements committed by the organizations working in the sector

1.2.3.2 Water Establishments

From the previously existing 21 local authorities, the law 221/2000 (and successive amendments) created 4 regional water Establishments for water exploitation:

- Beirut and Mount Lebanon
- North Lebanon
- South Lebanon
- Bekaa

In addition, it has been reaffirmed the role of the Litani River Authority that is responsible for irrigation water for the whole Litani watershed.

The roles of the establishments are as defined by the law 221/2000 (MoEW 2012):

- Design, implement, operate and maintain potable and irrigation distribution projects based on national master plan and resources allocated by MoEW;
- Collect, treat and dispose of wastewater based on treatment and outfall sites approves by MoEW;
- Propose water supply, irrigation and wastewater tariffs;
- Monitor water quality for distributed water supply and irrigation.

In the NWSS it has been emphasized their role as service providers and their direct responsibility in:

- Provision of services including billing and collection
- Maintenance and renewal of infrastructure
- Funding and execution of investment programs

and in collaboration with MoEW the responsibility in:

- Long term planning
- Evaluation of infrastructure and investment requirements

These Water Establishments are the main stakeholders in the management of the water sector at the regional level.

1.2.3.3 CDR

The Council for Development and Reconstruction has been founded in 1977 to be the governmental Unit responsible for reconstruction and development. It is responsible for financing and implementation of infrastructure projects to rehabilitate, extend, modernize existing infrastructure or build new. CDR is an institution that implements large investment projects within the framework of the National Water Policy (EMWIS 2015).

Contrary to other authorities, the CDR was an autonomous institution endowed with extended jurisdiction and is directly accountable to the Council of Ministers through the Prime Minister (CDR 2015).

The main tasks can be summarized as follows:

- Preparing general plan for the country, investment and implementation programs for reconstruction and development projects.
- Mobilizing external financing for priority projects within the investment plans.
- Implementing projects by appointment from the Council of Ministers.
- Taking action in rehabilitating the public administration and reconstruction of the infrastructure and negotiating foreign financing agreements.

From the definition of the roles among the main actors there is a fragmentation of responsibilities for investment planning and execution that neither the law 221 neither the NWSS have been capable to address (WORLD BANK 2010):

- CDR, as mentioned also in the NWSS, is responsible for planning and execution of donor-funded projects;
- MoEW is responsible for budget-financed investments;
- Regional Water Establishments can execute capital works based on cash flow availability generated by revenues;
- other minor national actors like CFD (Central Fund for Displaced) or CoS (Council of the South) have also this kind of responsibilities.

This fragmentation is also accompanied by low capacity of coordination, in particular between MoEW and the CDR, and is causing low levels of efficiency in public expenditures (WORLD BANK 2010).

1.2.3.4 Performance Evaluation Committee

This is an inter-ministerial committee mentioned since the publication of law 221 and reiterated also in the NWSS but that has not been established yet. The committee, which should be set up within the MoEW and the Ministry of Finance, should be responsible for valuation and monitoring of Water Establishments under technical and financial point of view.

1.2.3.5 Municipalities

The Municipalities are structures placed under the Ministry of the Interior and in the past played a role in the sector especially in preparing general plans for water projects, in establishing sewage disposal facilities and for some environmental issues.

These roles, affirmed by law in 1977 (Comair 2007), for certain authors, have been gradually decreasing in an optic of centralization of the powers of the state mainly due to a tendency of reconsolidation of power from local to central after the Civil War period (Dewailly et al. 2004), (Alles & Brochier-Puig 2014).

The more recent legislation in the water sector has practically cancelled their role in favor to a more centralized management at regional (through the Establishments) and national levels (through the CDR that is actually managing more than 75% of the funds designated to their development) (Verdeil et al. 2009).

This is particularly evident analyzing the NWSS document, where the term “Municipality” is used just two times: one to show that they have been involved in the elaboration of the strategy through the Ministry of Interior; and a second time when, in case of local committees that have not yet handover their infrastructures to the Establishments, they are defined, as “private providers” in the current institutional setting.

Even if they are not supposed to be involved in the implementation of the National Water Strategy they are de-facto involved in providing minimal services for their citizens especially regarding waste-water (Nizam 2011), a sector where the Establishments have not really entered especially in rural areas until today.

Also in water service provision the Municipalities find themselves often involved in providing small replacements and reparation of equipment when the Establishment is not able to intervene.

This discrepancy between legal and de-facto responsibilities has created also confusion in the population itself, that is not able to identify the responsible for the management of their infrastructures, and has weakened the accountability line between policy-makers and service providers (WORLD BANK 2010).

While in the water sector the ownership of the infrastructures by the Establishments has been more widely accepted around the Country (apart some local committees still in function that refused to handover the infrastructures and the management) for the wastewater infrastructures the legislation is less clear especially for the infrastructures that were constructed with Municipality financial means in the past.

1.2.3.6 Local committees

The Local Committees (LCs) are figures that were present since the French Mandate but that exploded in number during the years of civil war, when the Government was not able to provide service to most of the communities. Their role was in general restricted to operation, maintenance, rehabilitation and renovation of networks and equipment (WORLD BANK 2010).

Before law 221/2000, there were around 209 committees in operation, 18 percent for potable water, 60 percent are for irrigation, 14 percent for both potable water and irrigation and eight percent with no clear mandate.

With the creation of the Establishments, few committees for domestic water supply (those who refused to handover their infrastructures to the Establishments) still exist especially in remote areas of the Country.

Their role for domestic water supply is not recognized in the NWSS, apart as a “private providers”, while it is mentioned and encouraged the creation of formal Water Users Associations (WUA) for the operation and maintenance of irrigation schemes.

1.2.3.7 Citizens / Customers

The term “citizen” appears only two times in the whole National Water Strategy.

It is in the vision: “Water: a right for every citizen, a resource for the whole country”. This water right for every citizen is also mentioned as basis for the whole water sector in the paragraph relative to the Water Code that should be finalized in the next future. In both cases the term has a “passive” connotation.

The words “customer” or “consumer” are more present in the same strategy, but also here they are just mentioned as recipients of a service (mentioned some time as “end users”) that should be metered and not as legitimate actors in the sector.

It is mentioned the need to improve customer service departments at Establishment level but no practical action apart a generic “ensure communication with customers” is proposed.

The citizen is just seen as a holder of a right but without any active role in the sector in any of the national documents published in literature.

Water right, as internationally agreed, should be interpreted in terms of availability of a sufficient and continuous supply of water, accessibility of water to all citizens, adequate water quality, affordability, non-discrimination and availability of information.

According to a water right approach the communities and vulnerable groups should be empowered to participate in decision-making processes and should be enabled to claim their rights (ESCWA 2013).

Among the concept that the citizen is holder of this water right, widely culturally and politically accepted in Lebanon, and the capacity of the institutions to guarantee it, or for the citizen to be empowered to claim it, there is a wide gap (Makdisi 2007).

The terms citizens/customers are often reported together in this study in order to stress the important difference between citizen, as owner of the right to receive reliable public services, and customers, as owner of the duty to pay for the service purchased.

1.3 LITERATURE REVIEW

The purpose of this chapter is to provide information about the most important documents that have been published in relation to Lebanese water sector during the last 15 years and to stress their contribution in relation to the objective of this research especially in terms of:

- Water cost recovery strategy and Water tariff;
- Application of water sector strategy and comments about performances of the sector;
- Participation of citizens in water sector.

The main findings of the literature review can be summarized in few points:

- **Public service is considered as insufficient and of poor quality all around the country, and Lebanese institutions are enable to provide a reliable service;**
- **There is evident lack of trust between final users and Water Authorities;**
- **Water tariffs are considered by many authors as insufficient;**
- **Water meters and volumetric tariff have not been applied yet because feared by final users;**
- **Lack of data is a common problem in the whole sector;**
- **Participative processes for implementing policies and projects have not been applied at all in the sector;**
- **There are few capitalized experiences about cost recovery in water sector in Lebanon.**

In the last paragraph are shown the links between literature reviews findings and the formulation of research questions.

Divergences in interpretation about problems of water sector in Lebanon have influenced the choice of the author to propose the extensive literature review used for this research in such a detailed forms as annex.

1.3.1 Methodology used for literature review

Literature review has been conducted in different steps:

- Initial identification of some documents on internet by using keywords;
- Screening of these initial documents;
- Cross-reference research on internet or in online libraries;
- Final categorization of the documents upon major topics.

Literature review has initially started with research on Internet by using some main keywords (including some synonymous) in English and their corresponding French version including them in combination of at least 2 keywords:

- Lebanon / Liban
- Water / eau
- Tariff / tarif
- Sanitation / assainissement
- Cost-recovery / recouvrement des coûts
- Participative approach; participation / approche participative

It has been decided to include in the initial screening mainly documents that were published after 2000 (apart few exceptions).

The Internet research has been conducted initially on specialized library online archives:

- Loughborough University - Catalogue Plus Library
- WEDC online library
- Pro-Quest libraries

- Google Scholar

By rapid screening of titles and abstracts of the results, not all the material found with this initial research has been considered relevant because most of the documents were just slightly touching the topic of the dissertation.

The research has then been extended to Google, where more documents have been identified as the topic of this research, mainly touched on working papers, institutional reports and on proceedings of thematic conferences that are not usually published in online academic libraries.

Cross-reference between different publications and suggestions by some of the actors that have been interviewed have helped to identify other publications.

1.3.2 Main findings from literature review

From the extensive literature review some major topics have been identified as characterizing the water sector in Lebanon and are deeply related to the cost recovery problem.

1.3.2.1 Low quality of public service

Public services related to water in Lebanon are generally considered not adequate. Even if the MDG goals show that the universal access is almost reached, this data do not reflect the low quality of the service experienced by final users (ESCWA 2013).

Satisfaction about public water services is in general very low in the whole country but especially in some remote rural areas that historically have always experienced less provision of public services (WORLD BANK 2012; DAI - USAID 2012).

Water quality from public services is generally perceived as bad and it is partially related also to intermittence of the service (Korfali & Jurdi 2009).

The perception of the quality of the water by the population often it is not related to factual data or analysis but more to assumptions and lack of trust on public services (Habib et al. 2013). Analysis conducted on different brands of bottled water show that not necessarily the bottled water, considered as safer by the perception of the people, presents better parameters than the public service (Semerjian 2011).

Inequalities in the provision of service are spread around the whole country and can be related to different causes:

- Bad implementation of decentralization reforms and consequent conflict of attributions of local governments against central government (Alles & Brochier-Puig 2014) especially due to the consequence of civil war and need of the state to reaffirm is central role (Dewailly et al. 2004).
- Regional differences due to locally rooted social and political forces. This is more evident especially in remote rural areas (Verdeil 2008) where provision of services is also subject to sectarian and clienteles considerations (Makdisi 2007).
- Urban against rural, as the latter present higher per capita costs to be served and present less return of investment indexes for the Establishments (WORLD BANK 2009).

1.3.2.2 Incapacity of Establishments and institutions to provide reliable service

Actual inefficiencies in water public services provision have been attributed to many factors that can be divided in main categories:

At Establishment level:

- Lack of finance and of skilled personnel (ESCWA 2009);
- Lack of customer oriented service (ACWUA 2013b; DAI - USAID 2012; Gerlach 2011);
- Incapacity to put in practice termination policy for non payers or illegal connections (Nizam 2011; WORLD BANK 2010; Darwish 2004; Alles 2012; Verdeil 2008).

At institutional and legislation level:

- Fragmentary or not completed legislation and overlapping roles for some actors in the sector (Catafago 2005; Comair 2007; Gerlach 2011).
- Imposition of a legal framework that has not involved all stakeholders in its elaboration (Mazjoub 2011; ESCWA 2010).
- Lack of specific framework to allow participation of private sector (Alles 2012; ELARD 2013; GWP-Med & OECD 2010).

- Exclusion of Municipalities as actor in the sector (ELARD 2013).
- Political constraints and Clienteles practices at local level that obstacle the implementation of policies are mentioned by many documents (Stevenson 2007; Verdeil et al. 2009; Makhoul & Harrison 2002; Alles 2012; GWP-Med & OECD 2010; Makdisi 2007).
- Lack of a viable strategy for sustainability of the sector that is dependent on external supports from Government or external donors too (WORLD BANK 2012; Darwish 2004).

1.3.2.3 Lack of trust

"Lack of Trust" between final users and institutions and vice versa and often complete lack of dialogue, even between institutions themselves, is probably the most cited problem of the sector that is stressed in many publications.

Creating the conditions for mutual trust, among the actors is considered as a prerequisite of whatever intervention that should go in parallel with improving performance of the service (Yamout & Jamali 2007; ELARD 2013; Korfali & Jurdi 2009; Rault 2009; DAI - USAID 2012; Magiera et al. 2006; WORLD BANK 2009).

Some documents define deeper the causes of this lack of trust on public institutions by stressing in particular the **lack of accountability** for public services (WORLD BANK 2012; WORLD BANK 2007; Gerlach 2011; ACWUA 2013b; ESCWA 2013; Rault 2009).

Even for promoting water conservation through awareness campaigns it is considered essential that people could trust water authorities promoting the message (Magiera et al. 2006).

The lack of trust is affecting negatively the environmental management process in Lebanon and it is vital to concentrate in enhancing trust and cooperation relations among various stakeholders involved in the sector, including public institutions between them, private sector and citizens. It should be kept in mind that the process is forcedly slow to grow and easily breakable if not properly managed (Abbas et al. 2013).

1.3.2.4 Inadequate actual costs for final users

The provision of a not reliable public service practically obliges the majority of the citizens to look (at least for some months per year) for alternative water providers or independent solutions as a necessary copying strategy.

The average actual expense the households are incurring into for water **is around 3 times** what they are supposed to pay to public services. The average cost is estimated between 40 to 70 USD per household per month.

These data are confirmed by different independent sources in the last 10 years starting from the ICEA-CORAIL study in 2004 (CORAIL & IPSOS 2004), the World Bank study on Social Impact Analysis (WORLD BANK 2009) and the recently published "Blue Gold 5 Years Plan" (CIH 2013).

This cost that the household have to face is often **not sustainable** for many households as some of them spend for water, as a percentage of their monthly income, more than 2% (affordable value recommended by AWWA) (Assaf et al. 2004).

Many are spending even more than 5% of their monthly income (internationally recommended maximum ceiling for obtaining water) (WORLD BANK 2014b).

1.3.2.5 Insufficient water tariffs

Tariffs usually take in consideration only Operation and Maintenance costs and not Capital costs (Chatila 2005) and often they are fixed on social aspects instead than on sound managerial practices (Jaber 2002).

Establishments do not have the capacity to define tariffs upon real cost of the service (often unknown) (Gerlach 2011; Magiera et al. 2006). Cost-recovery rates are difficult to evaluate because of absence of water metering, evaluation of NRW and reliable customers database (GWP-Med & OECD 2010).

Tariffs are insufficient to cover real costs to provide water for the Establishments (ACWUA 2013b; Jaber 2002) but as mentioned in the NWSS no increases of tariffs are foreseen before concrete improvements in the service.

Many publications mention that actual tariffs do not encourage water conservation as they are de-linked from consumer demand and do not take in consideration the poor fraction of the population. They stress the need of the introduction of a volumetric tariff for aligning consumption with payment and more decisional power to the final user (Gerlach 2011; Nizam 2011; Makdisi 2007; WORLD BANK 2009).

Relying on informal providers, because of lack of reliable public services, is affecting much more poorest classes of society not only in terms of money but also in terms of stress and time to develop alternative copying strategies (Verdeil 2008).

Only few authors mention that the volumetric tariff that should be applied, should present the concept of a subsistence volume to be provided at a very low price in order to support the consumption of poor household (Riachi 2014; ESCWA 2009).

1.3.2.6 Difficulty to have data about willingness to pay

There are no many examples of willingness to pay surveys in literature.

In a survey conducted by World Bank, even if citizens declare to incur in very high costs for alternative water sources, only few of them (around 50%) would accept to increase their expenditure (for a maximum of 20%) for an improved public service. Willingness to pay is correlated with the wealth of the household but also with existence of trust on public authority: where the level of service is already sufficiently reliable, people are ready to pay more (WORLD BANK 2009).

Another study conducted in Saida shows that only 36% of people would pay more for a better service (USAID 2007).

1.3.2.7 Experiences of water meters and water demand management

Introduction of water meters for control of the demand is mentioned in the NWSS published in 2012 as one of the main strategic objective for the sector to be reached almost everywhere by 2015 (in Bekaa was expected 75% against 85% in North and South and 95% for BML).

In 2009 it was estimated by World Bank that only 4% of households had water meters installed (within the framework of new infrastructural projects) and all of them were charged with the same fixed annual fee like the others (WORLD BANK 2009).

Introduction of water meters is considered in most of the publications and reports as one of the key factor for improving sustainability of the sector, but few experiences have been tested up to date and few of them can be considered successful.

Between them it should be mentioned the experience done by GIZ in the last 10 years with the objective to test the introduction of water meters and monitor the consumption patterns of final users. The reports show

that in the monitored municipality, the lower third of subscribers consume less than 0,4 m3 per day and that the upper third consume 66% of the total water consumption. Introduction of water meters will drastically limit the consumption of this category of high consumers (GIZ 2011; GIZ 2012).

An experience of installation of water meters in Saida is mentioned by some publications (WORLD BANK 2009) as a promising example but no comments are provided by later publications about the reasons for interruption of the test.

Comments by some actors in the sector directly contacted by the author (Directors of Establishments and other experts) mentioned that the pilot project for the application of volumetric tariff was interrupted for political/confessional reasons related to poor acceptation of water meters by users.

In the region, water demand management through volumetric tariff is considered to be effective in limit water consumption only when daily capita consumption is higher than 100 liters (Magiera et al. 2006). This would be the case in Lebanon, where actual consumption per capita is estimated much above from 160 to 200 liters per capita per day (MoEW 2012).

As confirmed by some authors the approach that has been mainstreamed in the sector up to now in order to address the problem of poor services has always focused on increase of production instead of on water demand management. This has been partially corrected by reforms initiated by law 221 in 2000, but the effects are not yet achieved (Catafago 2005; Jaber 2002).

1.3.2.8 The key question of water conservation

As already mentioned in the previous chapter discussing water demand management, there is a consensus in the country about water shortages in the future and need to address this problem at national level (El Fadel et al. 2001).

The problem already highlighted in the national water strategy too has been worsened by the recent impact of Syrian refugee population that has increased the pressure with additional domestic demand (UNDP 2014d) not initially foreseen in the strategic document.

1.3.2.9 Need of awareness for citizens/customers

Many publications stress the need of awareness for final users that should target different categories of people but especially different objectives:

1. For water conservation and environmental protection:

- Increase the awareness of people upon their resources is considered as effective tool for their conservation and to accept related legislation. This kind of campaigns should be based on a deep analysis of actual situation of the targeted audience (ACWUA 2013a; Vlaardingerbroek & Taylor 2007);
- in other countries of the region awareness about water conservation contributed up to 4-8% of total water reduction (Magiera et al. 2006);
- water conservation and environmental concern need to be more integrated in school curricula in order to become more effective (Vlaardingerbroek & Taylor 2007) and to gain more importance for future generations.

2.For water cost-recovery:

- it should be clear to the people that the water tariff is covering the cost of the service, not the cost of water on itself (ACWUA 2013a).

3. For promoting better services and water right:

- People are not aware about their right to water in terms of quantity and quality, awareness is necessary

to empower them to play an active role in the sector and to claim them (Assaf et al. 2004; Mazjoub 2011).

4. To promote trust in the service:
- Especially in terms of water quality it is necessary to develop well designed and tested communication strategies to persuade the residents about reliability of the service and trust it (Habib et al. 2013).

1.3.2.10 Need of community and stakeholders participation

Most of the documents in the sector mention participation and the need to promote it, but many remain very general or focus instead only on specific constraints to apply participation in Lebanon. Few of them are proposing practical tools to promote it.

Between those that are mentioning a **generic need of participation**, these are the main points that are raised:

- It is recommended more involvement of population (bottom-up approach) for increasing ownership of the reform (WORLD BANK 2012) and the role of civil society should be strengthen to ensure efficient and sustained performances of the sector (ESCWA 2009).
- All stakeholders, including customers, should take part in the decision making loop (ACWUA 2013b) as it is already encouraged in other countries of the region where forms of consultation and representation of customers are introduced for taking part in the regulatory process (Gerlach 2011). This last sentence is contrasted by other authors that recognize that legislation in Lebanon like in other countries of the area is unresponsive to the demands for stakeholders and civil society participation and it should be revised through effective reforms (Mazjoub 2011).
- Communities and vulnerable groups should be empowered to participate in decision-making processes (ESCWA 2013).

Many documents recognize the need of participation, but focus instead on negative terms by stressing specific constraints or limits that exist in Lebanon:

- There is no real space where the participation could take place, as there are no institutional mechanisms where stakeholders could evolve and interact and without frameworks for follow-up of initiatives (ESCWA 2010).
- There is a strong consensus that the current role of Authority in Lebanon is purely informative, instead of cooperative and it is characterized by vertical dialogue and poor knowledge about stakeholders (Rault 2009).
- The actual reform process limited the consultation of the national water strategy only to “hand-picked civil society members involved with technical expertise rather than social concerns” (Makdisi 2007).
- Even if many actors, especially international NGOs, Donors and Development agencies recognize the importance of participation, in practical terms very little is achieved. Most of the time there is also incapacity to adapt international practices of participation to the reality of Lebanon characterized by “wasta” system (local power dominated by elites) (Makhoul & Harrison 2002). Public participation, if not properly exercised, can become a symbolic process in this context that can just help to reinforce these forms of local power (Stevenson 2007).
- Participation processes could contribute in promoting reconciliation against the fragmentation of the society, but at the same time it is common opinion that Lebanese population is not mature enough, educated or experienced to defend their rights and citizens do not trust enough the public to be involved in any process (Stevenson 2007).

Some publications have more proactive comments and give some directions in how to reinforce public participation, but they still remain quite generic:

- In a country like Lebanon where there is a general lack of data at national, but also at local level, it is very important to concentrate the effort in building local capacities in collecting and follow-up data about specific indicators for supporting and promoting sustainable development policies at local level (Nader et al. 2008).
- User participation should be allowed and encouraged through local councils (El Fadel et al. 2001).
- The recently published Blue Gold plan proposes the creation of a non-governmental Watch Dog Association from the civil society that should be founded by the sector in order to monitor the performances of the sector and play also a role in regulatory process.

1.3.3 Specific recommendations from literature review

In literature there is plenty of descriptions of problems in the sector, but very few pro-active recommendations that describe practical feasible steps for improvement and sustainability of the sector. The World Bank Country Water sector Assistance strategy recommends an approach of pilot projects with the creation of new business model for sustainability of Establishments and testing out reforms on a small scale before replication on a larger scale (WORLD BANK 2012).

Other reports propose that the experience of water demand management through volumetric tariff system applied in Saida should be taken as example in other areas of the country (Darwish 2004). Unfortunately this recommendation was published in 2004 and from that time not much work has been done in that sense apart some important experiences proposed by external donors like GIZ and USAID and previously mentioned in this same chapter.

1.4 RESEARCH METHODOLOGY

This chapter provides detailed information about the research topics and how it has been analyzed in a systematic way.

The research questions formulated within this chapter are essential to understand how the research has been articulated and presented in the following chapters.

1.4.1 Research Topics

From literature review it has been possible to identify some main characteristics of the sector that will be further studied with this research as they have a relevant impact in the definition and application of future strategies.

- Public water sector in Lebanon is characterized by very low standards of service and low rates of subscription and payment of citizens;
- The general approach applied by public authorities is practically investing only in increasing water production and does not apply at all water demand management strategies for improvement of the service and at the same time reduction of impact on natural water resources;
- Objectives regarding water demand management, in particular introduction of water meters and related volumetric tariff, are mentioned in National Water Strategy but remained practically unapplied up to date because of political inertia, lack of specific managerial practices but also lack of knowledge about possible customer perception of the whole process;
- In relation to public service provision, population is not consulted in any phase of the process and it is too often considered only as a final consumer that should pay by law, independently from the quality of the service provided.

1.4.2 Research Objective

The main objective of the research is:

To identify a possible way forward for the sector to implement better cost recovery and demand management measures as indicated in Lebanese National Water Strategy

The whole research aims to raise a constructive debate between all the actors involved in defining and implementing a strategy for the improvement of Lebanese public water services.

1.4.3 Research strategy and formulation of research questions

1.4.3.1 Questions from the literature review

The literature review about cost recovery and participation of final users in the sector has been fundamental for:

- Identifying actual situations and possible gaps in knowledge about the Lebanese water sector;
- Detail the objectives of the research;
- Define the questions for the surveys;
- Define the proper methodology to be used for conducting the surveys;

Considering the importance given to the literature it has been decided to attach an annotated literature review as annex to this dissertation.

Some points identified with the literature review have been important for defining the whole scope of the research and consequently to formulate the **<u>six main research questions:</u>**

1.1. Public service is considered as **insufficient** and **of poor quality** all around the country. Is **lack of trust** between final users and Water Establishments and institutions themselves, as mentioned in many documents, one of the main causes for low water cost recovery?

1.2. Actual Water tariff is considered as insufficient by many authors. What would be a recommended tariff? What is the **real willingness to pay** for the final users for a reliable service?

1.3. Programs that have promoted installation of water meters, have not been successful in Lebanon. The adducted reasons for failure are many, but the most frequent is referring to a generic aversion to this system by citizens. Are **water-meters really feared** by final users?

1.4. There is almost no experience about demand responsive approaches and at the same time citizens are not used at all to play any role in the public water sector. Does a **specific participative approach**, by helping people in understanding better their consumption patterns and actual costs, could help in promoting customers' participation to the sector and facilitate the implementation of National Water Strategy?

1.5. There are **no evident capitalized experiences** about cost recovery in water sector in Lebanon apart some documents produced mainly by GIZ. Lack of data is a common problem in the whole sector. Most of the opinions are based on "rumors" more than on factual data. When data are cited, sources are few and often not very recent. Are there **best experiences to replicate** in water sector in relation to cost recovery?

1.6. The actual implementation of **cost-recovery strategy** indicated in National Strategy **remains largely unapplied.** What are the reasons for this delay:

- Incapacity of the Establishment to make proper follow-up?
- Political interferences?
- Fear of citizens' response?

1.4.3.2 Objective and Questions for Main Actors Survey

Main objective:

2. *To assess opinions from different main actors in Lebanese water sector in relation to different aspects of the problem of cost recovery and water demand management in water sector and report their recommendations about improvement of the sector*

Interviews *with* main actors in Lebanese Water sector had as main purpose to:

- Actualize the information obtained through literature review;
- Receive recommendations about actions to be conducted for improvement of the sector;
- Raise the interest of the main actors to the finalities of the research and promote their participation in defining a future strategy for implementation of research recommendations

Questions related to this part of the research are:

2.1. What are actual problems and constraints in relation to cost-recovery in water sector in Lebanon?

2.2. What are the actual strategies in place for cost-recovery?

2.3. What is the level of application of water demand management measures in Lebanon?

2.4. Are there best experiences or capitalized pilot projects to refer to in the sector?

2.5. What are the different opinions about the actual tariff in relation to coverage of OPEX and CAPEX costs?

2.6. Would people pay more for a better and reliable service?

2.7. Do Municipalities still play a role, or should they have a role, in the Sector? And what are their relations with Establishments?

2.8. What is the level of participation of citizens as stakeholder in the sector and what are their relations with Establishments?

2.9. What are the expected reactions from Citizens in relation to application of water demand management measures indicated in National Water Strategy?

Even if it was not one of the main objectives of the research, it has been considered important to add an additional question related to Wastewater sector, and in particular to Wastewater tariff.

2.10. What is the strategy for applying the wastewater tariff?

The wastewater question has been added because it can be considered strictly related to the water tariff and especially because it concerns the same actors and the same stakeholders of Water sector.

1.4.3.3 Objective and Questions for Citizens/Customers' Survey

Main objective:

3. *To assess directly from Citizens actual water coping strategies in rural areas of Lebanon (North Bekaa) and willingness to pay in order to develop water programs in line with strategic objectives of National Water Strategy especially in relation to water demand management.*

Citizens' survey conducted with more than 1000 households in 5 Municipalities in North Bekaa had as main purpose to:

- Assess citizens opinions and recommendations for the implementation of strategies indicated in National Water Strategy;
- Raise awareness of the citizens about some key points mentioned in National Water Strategy in relation to water demand management and cost recovery;
- Assess the benefits of making use of participative methodologies for implementation of water projects in Lebanon;
- Define a tool for promoting participation of citizens that could be replicated during implementation within other projects in Lebanon and feed a national database.

Questions related to this part of the research are:

3.1. What are current citizens/customers' coping strategies for getting water in the study area?
3.2. How much do the population actually spend for water services (formal and informal providers)?
3.3. What are the expectations from a public water service in the study area?
3.4. What is the perceived quality of water from public network?
3.5. What is the citizens/customers' willingness to pay for a reliable public service for domestic water?
3.6. To what extent are citizens/customers willing to accept water meters installation and a volumetric based fee?
3.7. Does a participatory approach using citizens/customers' surveys facilitate the implementation of effective water demand management programs?

1.4.3.4 Relations between questions of each part of the research

Main Questions from Literature review PART 1	Correspondent research questions in Main Actors Survey PART 2	Correspondent research questions in Citizens' Survey PART 3
1.1 - Public service is considered as insufficient and of **poor quality** all around the country. **Is lack of trust** between final users and Water Establishments, as mentioned in many documents, one of the main causes for low water cost recovery?	2.1 - What are actual problems and constraints in relation to cost-recovery in water sector in Lebanon? 2.2 - What are the actual strategies in place for cost-recovery? 2.7 - Do Municipalities still play a role, or should they have a role, in the Sector? And what are their relations with Establishments? 2.8 - What is the level of participation of citizens as stakeholder in the sector and what are their relations with Establishments?	3.1 - What are current citizens/customers coping strategies for getting water in the study area? 3.3 - What are the expectations from a public water service in the study area? 3.4 - What is the perceived quality of water from public network?
1.2 - Actual Water tariff is considered as insufficient by many authors. What would be a recommended tariff? What is the **real willingness to pay** for the final users for a reliable service?	2.1 - What are actual problems and constraints in relation to cost-recovery in water sector in Lebanon? 2.2 - What are the actual strategies in place for cost-recovery? 2.5 - What are the different opinions about the actual tariff in relation to coverage of OPEX and CAPEX costs? 2.6 - Would people pay more for a better and reliable service? 2.10. What is the strategy for applying the wastewater tariff?	3.1 - What are current citizens/customers coping strategies for getting water in the study area? 3.2 - How much do the population actually spend for water services (formal and informal providers)? 3.5 - What is the citizens/customers' willingness to pay for a reliable public service for domestic water?
1.3 - Programs that have promoted installation of water meters, have not been successful in Lebanon. The adducted reasons for failure are many, but the most frequent is referring to a generic aversion to this system by citizens. **Are water-meters really feared by final users?**	2.3 - What is the level of application of water demand management measures in Lebanon? 2.9 - What are the expected reactions from Citizens in relation to application of water demand management measures indicated in National Water Strategy?	3.6 - To what extent are citizens/customers willing to accept water meters installation and a volumetric based fee?

1.4 - There is almost no experience about demand responsive approaches and at the same time citizens are not used at all to play any role in the public water sector. Does a **specific participative approach**, by helping people in understanding better their consumption patterns and actual costs, could help in promoting customers' participation to the sector and facilitate the implementation of National Water Strategy?	2.7 - What is the level of participation of citizens as stakeholder in the sector and what are their relations with Establishments?	3.7 - Does a participatory approach using citizens/ consumers' surveys and WTP surveys facilitate the implementation of effective water demand management programs?
1.5 - There are **no evident capitalized experiences** about cost recovery in water sector in Lebanon apart some documents produced mainly by GIZ. Lack of data is a common problem in the whole sector. Most of the opinions are based on "rumors" more than on factual data. When data are cited, sources are few and often not very recent. Are there **best experiences** to replicate in water sector in relation to cost recovery?	2.4 - Are there best experiences or capitalized pilot projects to refer to in the sector?	
1.6 -The actual implementation of cost-recovery strategy indicated in National Strategy remains largely unapplied. What are **the reasons for this delay:** • Incapacity of the Establishment to make proper follow-up? • Political interferences? • Fear of citizens' response?	2.1 - What are actual problems and constraints in relation to cost-recovery in water sector in Lebanon? 2.2 - What are the actual strategies in place for cost-recovery? 2.3 - What is the level of application of water demand management measures in Lebanon?	3.6 - To what extent are citizens/customers willing to accept water meters installation and a volumetric based fee?

Environmental activity in the municipality of Zabboud

PART II

MAIN ACTORS' SURVEY

2.1 SURVEY PREPARATION AND METHODOLOGY

2.1.1 Objectives

The **main objective** for this part of the research is

- To assess opinions from different main actors in Lebanese water sector in relation to different aspects of the problem of cost recovery in water sector and report their recommendations about improvement of the sector

The **specific objectives** can be resumed as follow:

- Actualize the information obtained through literature review;
- Receive recommendations about actions to be conducted for improvement of the sector;
- Raise the interest of the main actors in Lebanese water sector to the finalities of the research and promote their participation in defining a future strategy for implementation of research recommendations.

2.1.2 Definition of research questions

The main questions for this part of the research have been identified starting from the Literature Review presented in part 1 of the research.

The methodology for definition of research questions has been properly illustrated in chapter 1.4.3.2.

From the 10 research questions of this part of the study, **24 open questions** have been defined in order to create a sequence that could facilitate the proper elaboration of each topic from the respondents. It is a similar process of “mental elaboration” through a questionnaire very similar to what is proposed in part 3 of this research with the citizen’s survey.

The questions can be regrouped in 5 main chapters:

1. Cost recovery (11 questions);
2. Customer services (3 questions);
3. Calculation of the tariff (6 questions);
4. Participation of final users (3 questions)
5. Wastewater (1 question)

The complete list of questions is attached at the end of this report and the presentation of the data of the survey is organised upon the sequence used during the interviews.

The conclusions of this part of the research are organised upon the 24 main open-questions.

2.1.3 List of actors interviewed

36 interviews were conducted between January and May 2015. with the main actors of the water sector in Lebanon from the following public institutions : Water Establishements, Ministry of Water and Energy, Council for Development and Reconstruction. Representatives from Donors, members from Academics specialized on the subject and Experts on water challenges in Lebanon also were interwieved. Even if according to the law Municipalities don't have a role, they still play a role in the sector of Water. Some of them have been met for the preparation of citziens/customer's survey.

All the actors have been interviewed by the same person, Michele Pierpaoli from GVC, that has also prepared the questionnaire and is the project manager for the project.

Please find here below the list of actors that were interviewed and the categories used for analysis.

			CAT 1	CAT 2	CAT 3	CAT 4	
NAME	INSTITUTION	ROLE	Group Membership	Nationality	Years of experience in Water Sector	Years of experience in Lebanese Water Sector	date of interview
Roy Ibziak	BWE - Bekaa Water Establishment	Assistant to Management	Establishment	Lebanese	11-20	11-20	27/01/15
Gaby Nasr	NLWE - North Lebanon Water Establishment	Head of Service: Planning &Projects	Establishment	Lebanese	11-20	11-20	23/02/15
Maroun Elias Moussalem	BWE - Bekaa Water Establishment	General Director	Establishment	Lebanese	> 20	> 20	03/03/15
Ahmad Nizam	SLWE-South Lebanon Water Establishment	General Director	Establishment	Lebanese	> 20	> 20	10/03/15
Mitri Abi Jreiche	DAI - LWWSS	Management Advisor at South Lebanon Water Establishment	Establishment	Lebanese	> 20	> 20	10/03/15
Jamal Krayem	NLWE - North Lebanon Water Establishment	General Director	Establishment	Lebanese	11-20	11-20	29/04/15
Selim Catafago	LRA - Litani River Authority	President	Establishment	Lebanese	> 20	> 20	04/05/15
Randa Nemer	MoEW	Advisor to the Minister of Energy & Water	MoEW	Lebanese	> 20	> 20	24/02/15
Mona Fakih	MoEW	Director of Water	MoEW	Lebanese	11-20	11-20	27/02/15
Mahmoud Baroud	MoEW	Government Delegate at E.D.L.	MoEW	Lebanese	11-20	11-20	09/03/15
Fadi Comair	MoEW	General Director of Hydraulic and Electric Resources	MoEW	Lebanese	> 20	> 20	16/03/15
Suzy Hoayek	MoEW	Junior Wastewater expert	MoEW	Lebanese	6-10	1-2	18/05/15
Youssef KARAM	CDR	Head of Water, Wastewater and Infrastructure Department	CDR	Lebanese	> 20	11-20	19/05/15
Ibrahim Chahrour	CDR	Planning & PRogramming Division Director	CDR	Lebanese	11-20	11-20	19/05/15
Faten Adeda	CDR	Field manager	CDR	Lebanese	6-10	6-10	19/05/15
Cyril Dewaleyne	EU - European Union	Program Manager for Infrastructure, Water and Energy	Donor	International	3-5	3-5	12/02/15
George Cherabie	Italian Cooperation	Project Program Coordinator	Donor	Lebanese	> 20	3-5	24/02/15
Rami Wehbe	USAID	Program Management Specialist	Donor	Lebanese	11-20	6-10	25/02/15
George Akl	UNDP	Programme Officer	Donor	Lebanese	11-20	11-20	26/02/15
Samuel Lefevre	AFD - Agence Française de Développement	Chargé de Mission	Donor	International	1-2	1-2	02/03/15
Maria Saidy	UNICEF	WASH Program Officer	Donor	Lebanese	3-5	3-5	11/03/15
Dalia Lakiss	SDC - Swiss Agency for Developmenta and Cooperation	National Program Officer	Donor	Lebanese	1-2	1-2	27/03/15
Synne Bergby	UNHABITAT	Programme Planning Advisor	Donor	International	1-2	1-2	30/03/15
Roland Riachi	AUB - American University Beirut	Researcher	Academic	Lebanese	6-10	6-10	02/03/15
Nadim Farajallah	Issam Fares Institute - AUB	Faculty Research Director of Climate Change and Environment	Academic	Lebanese	> 20	> 20	06/03/15
Gebran Karam	LAU - Lebanese American University	Chairman	Academic	Lebanese	> 20	> 20	30/04/15
Imad El Khazen	CHEMONICS - WISE	O&M specialist & construction Supervisor	Expert	Lebanese	11-20	6-10	26/01/15
Salah Saliba	CHEMONICS - WISE	Technical Advisor	Expert	Lebanese	11-20	6-10	12/02/15
Bassam Jaber	DAI - LWWSS	Senior Advisor	Expert	Lebanese	> 20	> 20	20/02/15
Michel Majdallani	BTD - Bureau Technique de Developpement	Director	Expert	Lebanese	> 20	> 20	20/02/15
Nadia JUHARI	Human dynamics K.G - SISSAF	Water Key Expert	Expert	International	> 20	1-2	25/02/15
Amal Chammas	GFA consulting Group (ex GIZ)	Key Expert	Expert	Lebanese	11-20	11-20	26/02/15
Ahmad Al-Azzam	LWWSS	Allied Business Advisors	Expert	International	11-20	11-20	10/03/15
Randa Daher	World Bank Program	Project Coordinator	Expert	Lebanese	11-20	11-20	13/03/15
Philip Giantris	Valu Add Management Services - LWWSS	President	Expert	International	> 20	> 20	21/03/15
Charlotte Kalinowski	Hydroconseil	Expert institutionnel / développement local	Expert	International	6-10	3-5	13/05/15

Most of the interviews (27) have been recorded and trascribed.
The remaining interviewees preferred to do not record their answers. In this case it has been sougth the most possible accuracy in transcribing the answers at the time of the interview.
The majority of interviews has been conducted directly in English, just few of them have been conducted in French.The answers provided in French have been first transcribed, then translated in English by a professional translator.
The average length of an interview is 57 min ranging from a minimum of 28 and a maximum of 152 minutes.
Almost all the respondents replied to all the questions: the average number of replies per question is 34,3 on a total of 36 respondents.

2.1.4 Data analysis

All the material has been collected under anonymous form, as communicated to each actor before any interview, in order to facilitate freedom in expressing comments by each respondent.

It has just been used a classification of the respondents upon 4 main categories to verify possible correlations during the analysis of the answers:

1. Group Membership (Establishment, MoEW, CDR, Expert, Donor, Academic)
2. Nationality (Lebanese or International)
3. Years of Experience in Water sector (1-2; 3-5: 6-10; 11-20; more than 20)
4. Years of Experience in Lebanese Water sector (1-2; 3-5: 6-10; 11-20; more than 20)

Analysis have been conducted for the answers by crossing the 4 categories in different modalities.

No relevant correlation has been identified using categories related to Nationality nor years of experience (2, 3 and 4).

The only category that has shown some relevance and has been considered relevant to be shown along the report is Group Membership (category 1).

In all the graphs group membership will be always highlighted trough specific colors. **The color markers will remain constant during the whole report and are very important for the interpretation of the graphs.**

Please refer to the table aside for relation between groups and colours.

Group Membership	Number of Actors
CDR	3
Donor	8
Establishment	7
Expert	10
MoEW	5
Academic	3
	36

The transcribed answers have been analysed with a software for qualitative analysis QSR NVIVO 10.

All the answers (from open questions) have been classified (coded) in categories and sub-categories when they had similar contents in order to facilitate analysis.

The frequency of answers in each category has been counted and is the basis for the presentation of the results of this research through graphs.

The number of categories created has been a compromise between necessary synthesis and readibility of the data from one side, and willingness to avoid over-semplification or loss of information from the other side.

In general there are two type of answers that have been provided during the interviews:

- Judgemental answers - The respondent is providing a specific judgement about a certain topic (e.g: estimating the level of subscriptions in the country). The answers can be classified only in one category ("Low" or "Acceptable" or "High" or "I do not know") and the total sum of answers is coinciding with the sum of respondents to that question.
- Descriptive answers – The respondent is providing general comments or recommendations about a certain topic (e.g.: what are the best experiences related to cost recovery in Lebanon?). In this case the answers from the same respondent can be classified under different categories (e.g.: GIZ in Saida and ONDEO in Tripoli). For this reason, in some of the graphs it is possible that the total number of frequencies, accounted as sum of events in each category, is higher than 36.

The answer of a single respondent can be classified in more categories but in any case it is not possible to count the same actor two times within the same category.

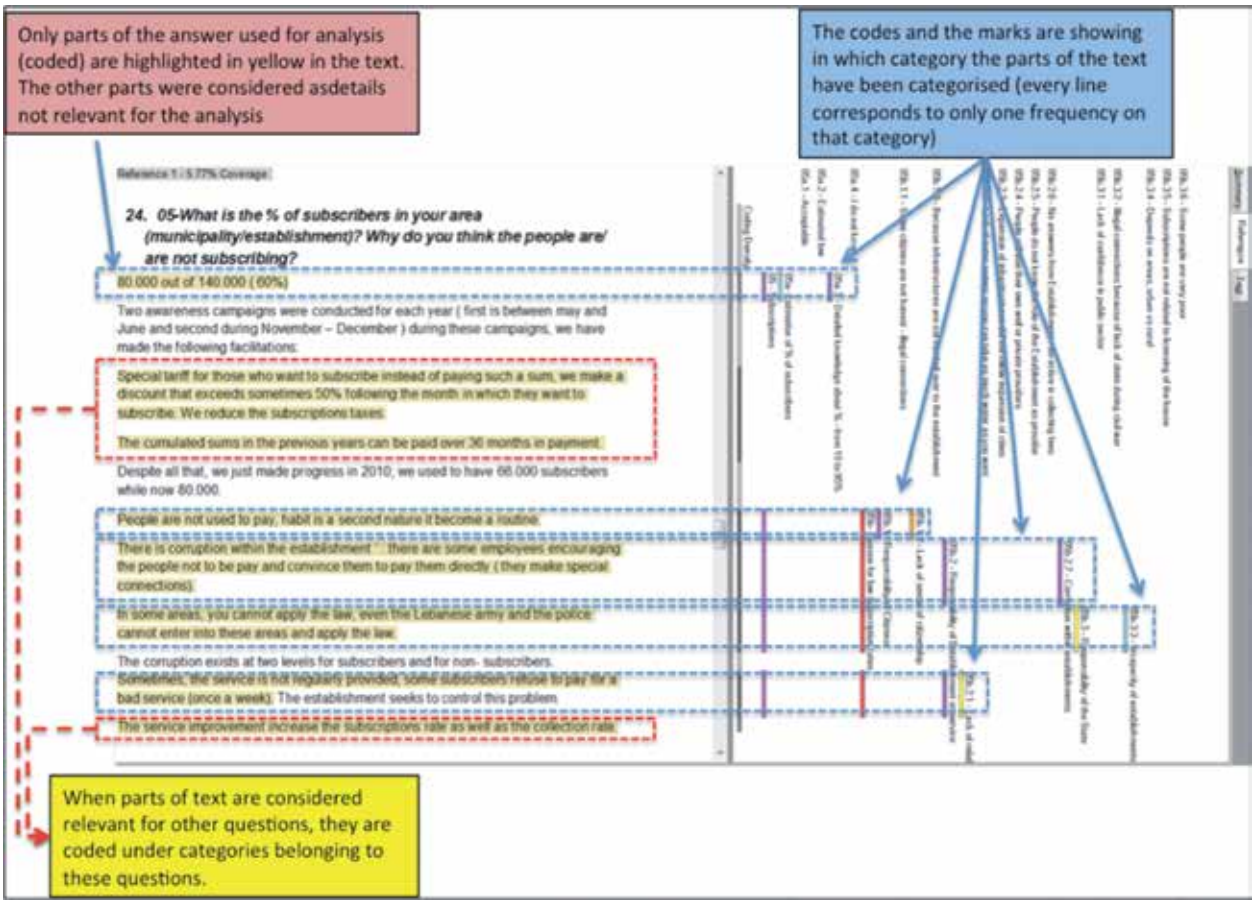
This possibility to split the same answer from the same respondent in more than one category has been considered essential in order to do not lose important information provided by the respondents.

All the processed data and the tables of classification are annexed to this report.

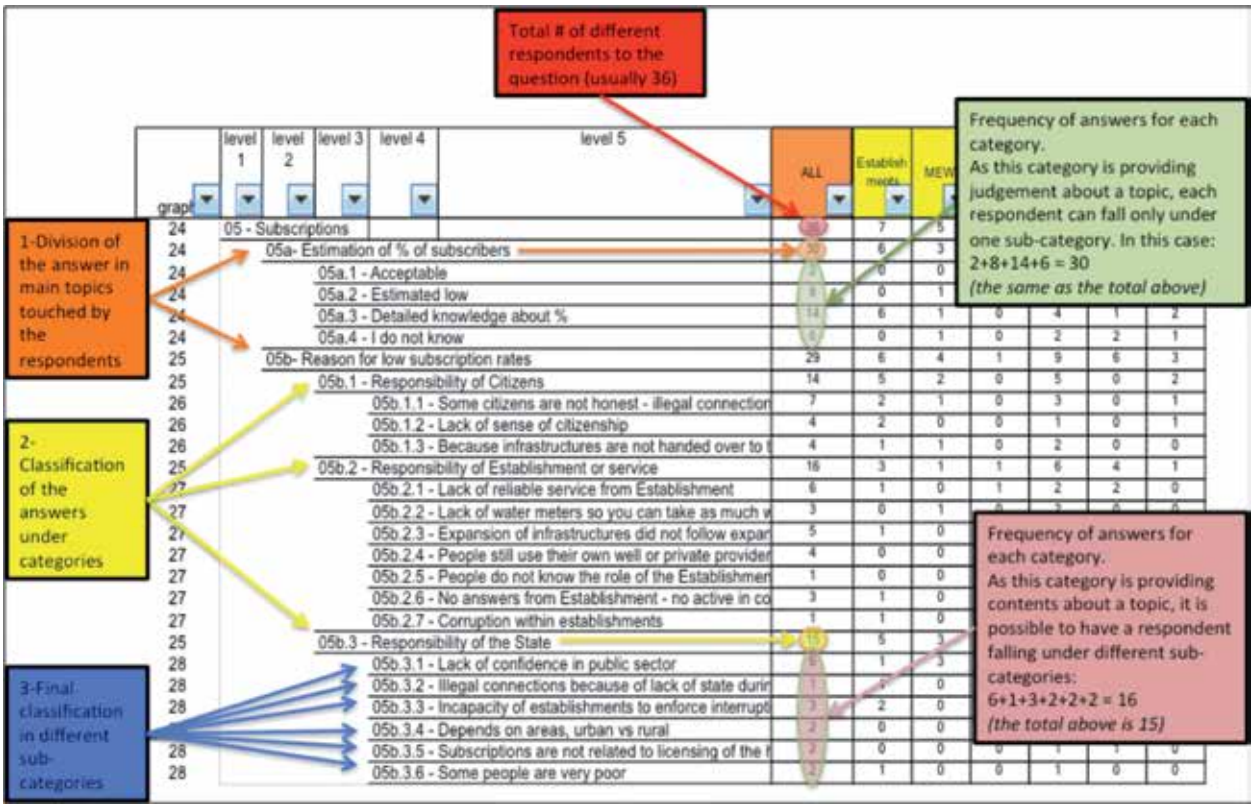
Please find in the following pages an exemple to visualise the codification and analysys processes conducted upon three main steps:

- STEP 1 - Analysis of text and coding under categories;
- STEP 2 - Creation of tables of frequency from coded text
- STEP 3 - Creation of graphs

STEP 1 - Analysis of text and coding under categories



STEP 2 - Creation of tables of frequency from coded text



STEP 3 - Creation of graphs from tables of frequency

Total # of different respondents to the question (usually 36)

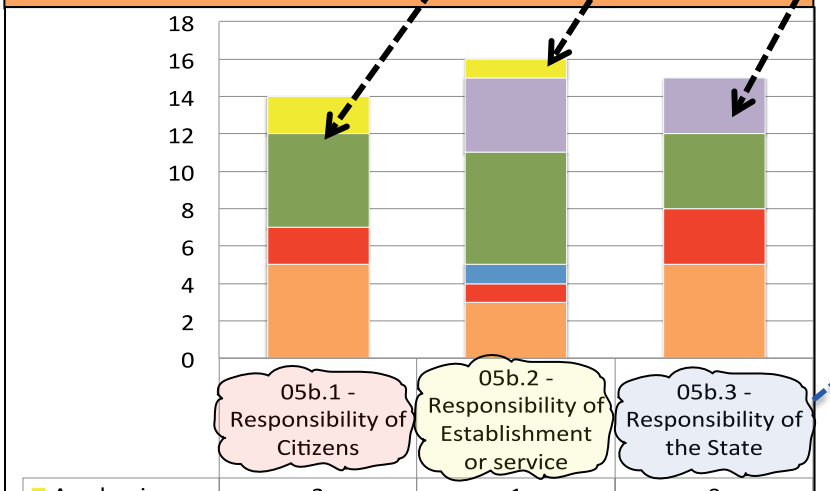
Total of answers divided by type of respondents
36 = 7 WEs + 5 MEW + 3 CDR + 10 Experts + 8 Donors + 3 Academics

Title of the graph

Reference for graph that has been produced. Same number meaning that it will be shown in the same graph

graph	level 1	level 2	level 3	level 4	level 5	ALL	Establishments	MEW	CDR	Expert	Donors	Academic
24	05 - Subscriptions					36	7	5	3	10	8	3
24		05a- Estimation of % of subscribers				30	6	3	3	8	7	3
24			05a.1 - Acceptable			2	0	0	2	0	0	0
24			05a.2 - Estimated low			8	0	1	1	2	4	0
24			05a.3 - Detailed knowledge about %			14	6	1	0	4	1	2
24			05a.4 - I do not know			6	0	1	0	2	2	1
25		05b- Reason for low subscription rates				29	6	4	1	9	6	3
25			05b.1 - Responsibility of Citizens			14	5	2	0	5	0	2
26				05b.1.1 - Some citizens are not honest - illegal connection		7	2	1	0	3	0	1
26				05b.1.2 - Lack of sense of citizenship		4	2	0	0	1	0	1
26				05b.1.3 - Because infrastructures are not handed over to t		4	1	1	0	2	0	0
25			05b.2 - Responsibility of Establishment or service			16	3	1	1	6	4	1
27				05b.2.1 - Lack of reliable service from Establishment		6	1	0	1	2	2	0
27				05b.2.2 - Lack of water meters so you can take as much w		3	0	1	0	2	0	0
27				05b.2.3 - Expansion of infrastructures did not follow expan		5	1	0	0	3	1	0
27				05b.2.4 - People still use their own well or private provider		4	0	0	0	1	2	1
27				05b.2.5 - People do not know the role of the Establishmen		1	0	0	0	1	0	0
27				05b.2.6 - No answers from Establishment - no active in co		3	1	0	0	0	2	0
27				05b.2.7 - Corruption within establishments		1	1	0	0	0	0	0
25			05b.3 - Responsibility of the State			10	5	3	0	4	3	0
28				05b.3.1 - Lack of confidence in public sector		6	1	1	0	0	2	0
28				05b.3.2 - Illegal connections because of lack of state durin		1	1	0	0	0	0	0
28				05b.3.3 - Incapacity of establishments to enforce interrupt		3	2	0	0	0	1	0
28				05b.3.4 - Depends on areas, urban vs rural		2	0	0	0	2	0	0
28				05b.3.5 - Subscriptions are not related to licensing of the h		2	0	0	0	1	1	0
28				05b.3.6 - Some people are very poor		2	1	0	0	1	0	0

Q.5.b - Reason for low subscription rates



	05b.1 - Responsibility of Citizens	05b.2 - Responsibility of Establishment or service	05b.3 - Responsibility of the State
Academic	2	1	0
Donors	0	4	3
Expert	5	6	4
CDR	0	1	0
MEW	2	1	3
Establishments	5	3	5

The **title of the graph** is in **Orange box** if it is presenting answers for a main question.
In **green** when it is presenting more details related to specific group of answers.

Answered highlighted. Indicates that it is commented in the narrative part aside. The colors used do not have any specific meaning and have been chosen on random basis.

2.1.5 Presentation of survey data

The report is presented following the same exact order of the questionnaire used for the semi-structures interviews.

For each question, graphs have been developed to show the main contents of the answers. Aside each graph it has been added a narrative comment from the Author, with the only purpose to better explain the content of the graphs that presented higher frequencies and facilitate the readability of the report.

Usually all the categories of answers that are commented asides are highlighted in the graph. In presenting the data it has been decided to do not use percentage values because, considering the different categories of respondents and different representativeness of each category, it has been estimated that this could lead to misinterpretation of the data. Some of the questions have been provided just by few respondents and it is always important to visualize the effective number of respondents, the category to which they belong and their relative weight in relation to the other categories.

Some answers that have been provided only by few actors are reported only in the graphs for completeness of information, but have not been explicitly commented in order to do not over-represent their weight in front of the reader.

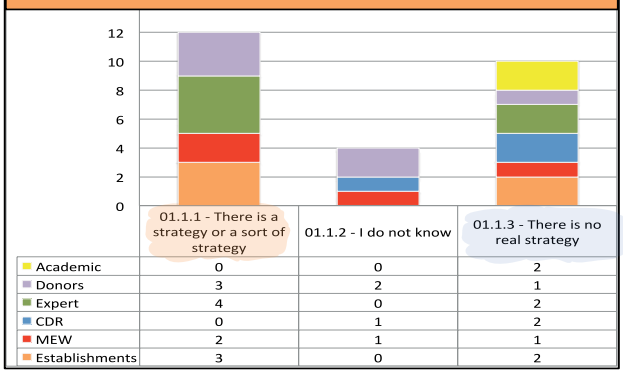
2.2 ANALYSIS OF DATA FROM SEMI-STRUCTURED INTERVIEWS

2.2.1 Chapter 1 - Cost Recovery

Q.01 Cost recovery strategy in Lebanese water sector

Exact formulation of the Question: *Cost-recovery for water services what is the actual strategy and what are the constraints and challenges?*

Q1.a-Is there a Cost recovery strategy in water sector?

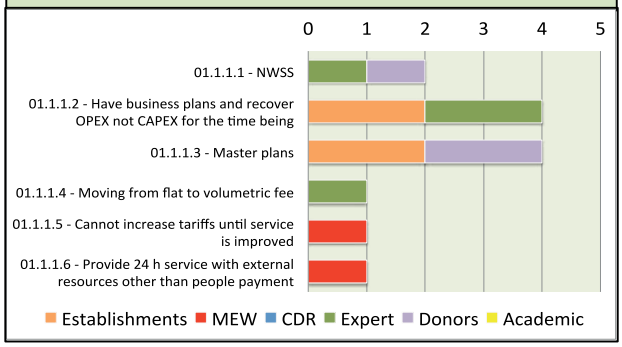


	01.1.1 - There is a strategy or a sort of strategy	01.1.2 - I do not know	01.1.3 - There is no real strategy
Academic	0	0	2
Donors	3	2	1
Expert	4	0	2
CDR	0	1	2
MEW	2	1	1
Establishments	3	0	2

Is there any cost recovery strategy in water sector?

While the majority declares there is one, or a sort of strategy, almost half of the interviewed actors think that there <u>is no real strategy in place</u> for cost recovery in the Lebanese water sector.

1.1.1 - There is a strategy or a sort of strategy



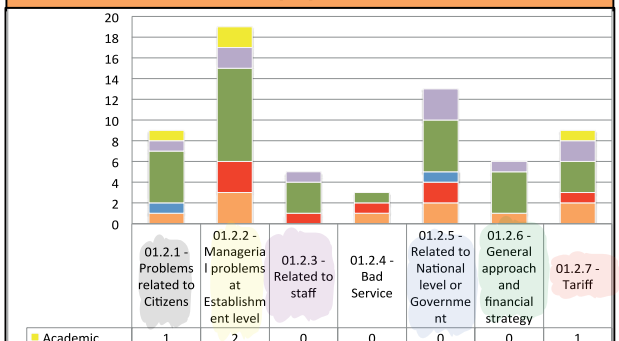
There is a strategy or a sort of strategy

Those who replied that a strategy is in place, explained that the strategy exists and consists of:

- Elaboration of business plans with the objective to recover OPEX (Operation and Maintenance) costs;
- Elaboration of Master Plans for planning future interventions.

Just few (but not from Public institutions) defined the NWSS (National Water & Sanitation Strategy published in 2012) as an effective existing strategy for the sector to promote cost-recovery.

Q1.b - Problems with existing cost-recovery



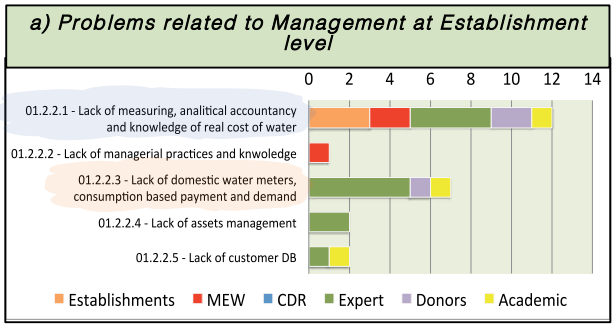
	01.2.1 - Problems related to Citizens	01.2.2 - Managerial problems at Establishment level	01.2.3 - Related to staff	01.2.4 - Bad Service	01.2.5 - Related to National level or Government	01.2.6 - General approach and financial strategy	01.2.7 - Tariff
Academic	1	2	0	0	0	0	1
Donors	1	2	1	0	3	1	2
Expert	5	9	3	1	5	4	3
CDR	1	0	0	0	1	0	0
MEW	0	3	1	1	2	0	1
Establishments	1	3	0	1	2	1	2

Problems with existing cost-recovery strategy

When asking what are the problems with the actual (existing or not) strategy for cost recovery the replies were various and identified different possible causes.

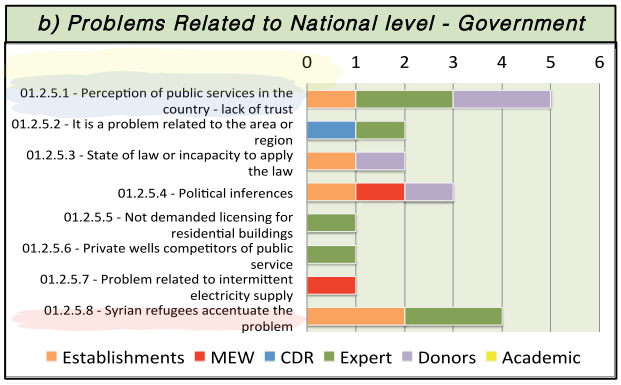
It can be observed in any case that the majority of the responses focused on problems related to Water Establishments (to be noticed that also many representatives of Establishments replied that way).

More details are provided for each category of answers in the following schemes.



a) Problems related to management at Establishments level

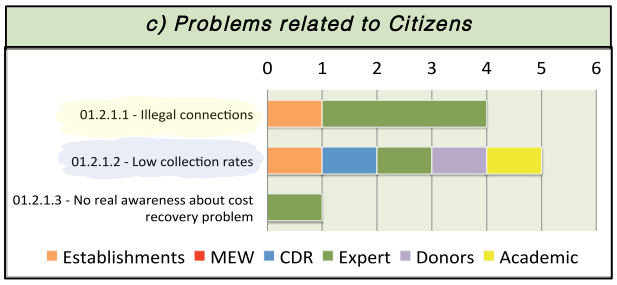
- Lack of measuring, analytical accountancy and real cost of water are considered as the most important problem. All respondents from establishments and MoEW highlighted this aspect.
- Lack of domestic water meters and consumption-based payment are the second major problem, mainly mentioned by experts



b) Problems related to National level or Government

The majority focused on a general lack of trust in public services that is spread all over the country. Others described Syrian refugees as an additional burden that is worsening the situation in terms of cost recovery.

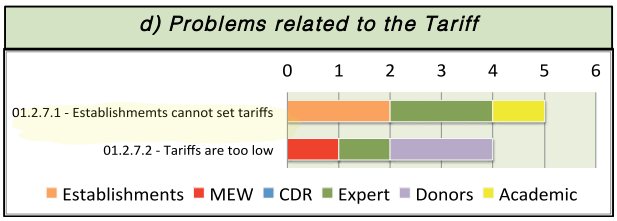
Political interferences and inability to enforce the law (especially in terms of interrupting the service for non-payers) were also indicated as a common problem for the country.



c) Problems related to Citizens

Low collection rates and illegal connections are indicated as the most important causes that can be attributed to citizens.

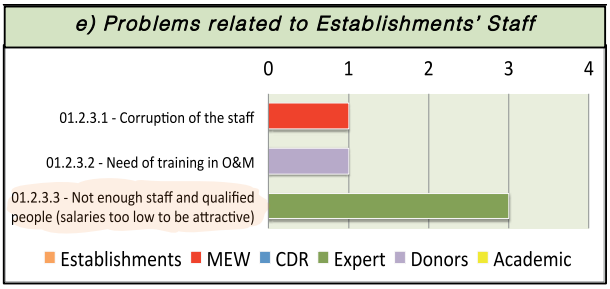
Later in the questionnaire, other answers highlighted that problems related to low collection rates are not just responsibility of citizens but also to a diffused incapacity of the Establishments to make follow-up for collecting payments.



d) Problems related to Tariff

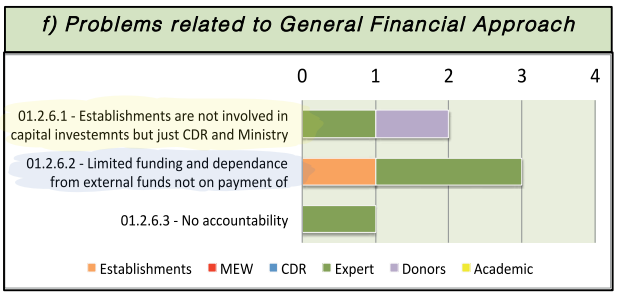
Some emphasized that actual tariffs are too low to recover at least operation and maintenance costs and that Establishments are unable to set new adequate tariffs.

These aspects will be deepened in following questions



e) Problems related to Establishments' staff

Lack of enough qualified personnel at Establishment is considered as one of the main causes. An emphasis has been put on the fact that public sector wages are too low compared to the private sectors' and make it difficult to retain qualified staff.

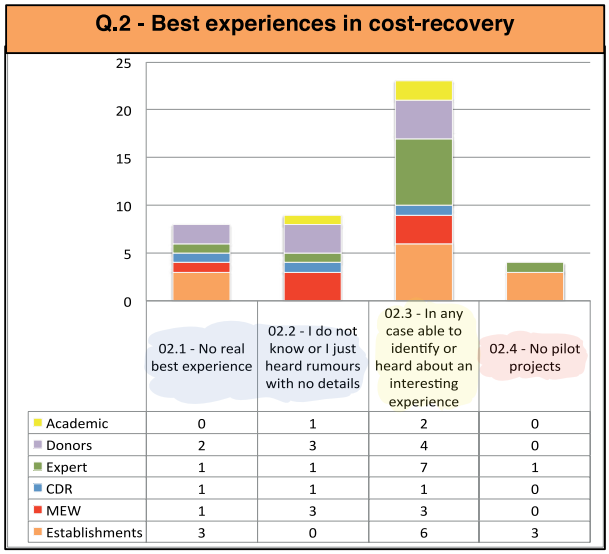


f) Problems related to General Financial Approach

The high dependency on external funds instead of on customers' payments is considered a weakness. The fact that Establishments are too little involved in the Management of these external funds for capital investments cause discontinuity between actors in setting and then implementing strategies for cost recovery.

Q.02 Best experiences of cost recovery in Lebanese water sector.

Exact formulation of the Question: *What are in your opinion the best experiences in cost-recovery in Lebanon? Why are these experiences important?*

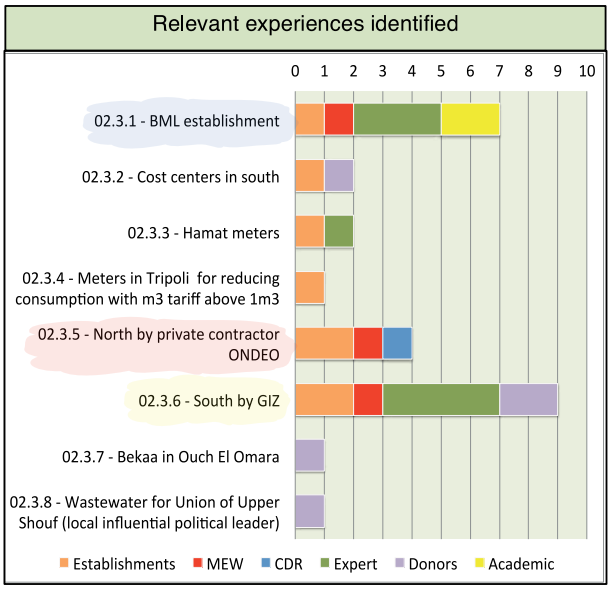


	02.1 - No real best experience	02.2 - I do not know or I just heard rumours with no details	02.3 - In any case able to identify or heard about an interesting experience	02.4 - No pilot projects
Academic	0	1	2	0
Donors	2	3	4	0
Expert	1	1	7	1
CDR	1	1	1	0
MEW	1	3	3	0
Establishments	3	0	6	3

Best experiences in cost-recovery

When requested to describe best experiences related to cost recovery in water sector, the majority of the interviewed was able to mention at least one specific experience (please check following graph) A relevant number of respondents commented that:

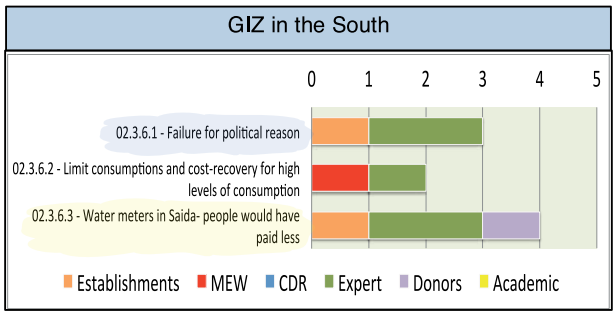
- There are no real pilot projects;
- There are no real best experiences in Lebanon (but just trials or failures, or only with private sector);
- They do not know, or just heard rumors, about any specific project.



Relevant experiences identified

Between the most cited best experiences:

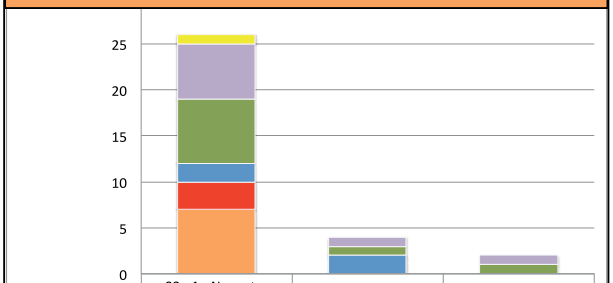
- GIZ experience in the South (Saida) that even if considered generally positive for various aspects, had unfortunately failed for political reasons (please refer to following graph for more comments provided)
- BML Establishment (Beirut Mount Lebanon) because it is the only one presenting good cash flow. In relation to this experience it has been mentioned the capacity of the Establishment to enforce termination policy in case of nonpayment.
- Contract with private sector in the North (Tripoli) with Company ONDEO.



Q.03 a) Measurement of production

Exact formulation of the Question: *Are there water meters at production level?*

Q.3.a - Are there water meters at production level everywhere?



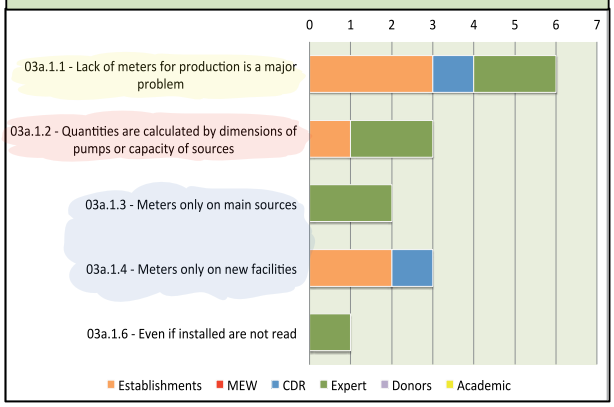
	03a.1 - No water meters on production everywhere	03a.2 - I do not know	03a.3 - Water meters are probably present
Academic	1	0	0
Donors	6	1	1
Expert	7	1	1
CDR	2	2	0
MEW	3	0	0
Establishments	7	0	0

Are there water meters at production level everywhere?

The majority of respondents stated that there are no water meters at production level everywhere.

Only few actors are not fully aware of the situation.

Comments about problem of lack of bulk water meters



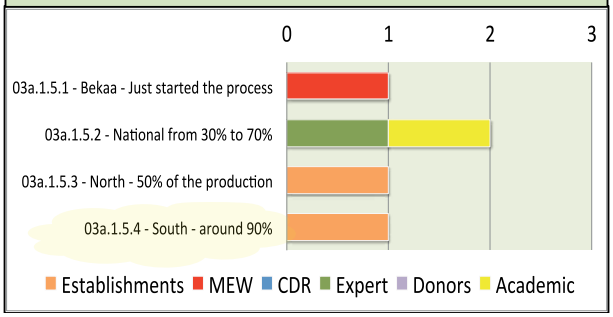
Comments about problem of lack of bulk water meters

The majority, and especially the Water Establishments, considers the lack of bulk meters as one of the main problems for water management.

Some respondents emphasized that if bulk meters are installed, they are just on new facilities or on main sources.

Quantities produced are calculated just considering the dimension of the pumps installed or by average capacity of source.

Estimations of production meters coverage



Estimations of production meters coverage

It is interesting to notice that just few respondents were able to provide a rough estimation about presence of bulk meters.

The majority of them did not even try to estimate.

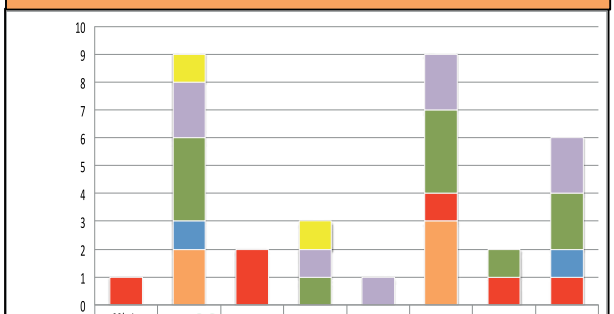
This shows that probably the problem of lack of bulk meters at production level even if considered very important by many actors-has not been properly quantified in reports.

From this question, and other information from other questions, it seems that SWE (South Water Establishment) is the Establishment were the investments for production meters have been higher.

Q.03 b) Calculation of production costs

Exact formulation of the Question: *How is the production cost calculated?*

Q3.b - How is it calculated the production cost?



	03b.1 - Calculated on the basis of the demand not on the production	03b.2 - By simple estimation	03b.3 - Calculated on generic assumptions	03b.4 - Based only on cashflow	03b.5 - They just started to introduce the concept of cost centers	03b.6 - Based on electricity	03b.7 - Nobody is calculating	03b.8 - I do not know
Academic	0	1	0	1	0	0	0	0
Donors	0	2	0	1	1	2	0	2
Expert	0	3	0	1	0	3	1	2
CDR	0	1	0	0	0	0	0	1
MEW	1	0	2	0	0	1	1	1
Establishments	0	2	0	0	0	3	0	0

It is interesting to notice how the replies to such an important question are so much spread between the interviewees and the presence of a large number of "I do not know".

This probably means that the subject did not receive enough attention in the past.

Two answers are recurring more often and it is interesting to notice that all respondents from Establishments are within them:

- By simple estimation
- Based on electricity

Without entering in too many details it is clear that the problem of calculation of cost per m3 of production exists in Lebanon.

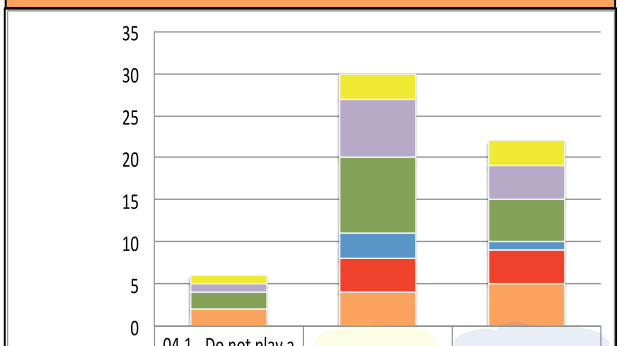
Approximation in the definition of the costs combined with lack of measurement of produced quantities imply that the real cost per m3 in Lebanon is forcedly largely approximated when not even completely unknown.

As it will be shown later with other questions, it is not clear among the respondents what should be the tariff that could cover the real costs for the Establishments.

Q.04 Role of Municipalities in water sector

Exact formulation of the Question: *What are the actions implemented at local level by municipalities to overcome the actual deficiencies (if there are) of service? Should Municipalities be involved in the water sector? And in case: how?*

Q.4 - Role of Municipalities in water sector



	04.1 - Do not play a role anymore or should not play a role	04.2 - Still play a role	04.3 - Should have a role
Academic	1	3	3
Donors	1	7	4
Expert	2	9	5
CDR	0	3	1
MEW	0	4	4
Establishments	2	4	5

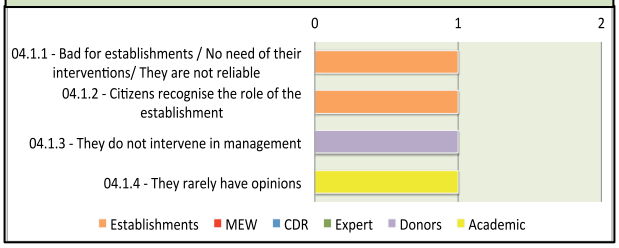
Role of Municipalities in water sector

Upon National Water Strategy (NWSS), published in 2012, Municipalities do not have any role in the water sector.

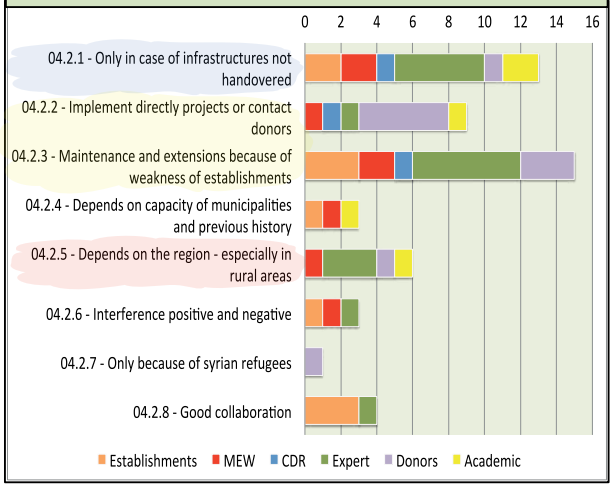
Most of the actors declare instead that Municipalities still have a role in water sector and most of them are in favor of giving a role to Municipalities (even some actors from Ministry and Establishments).

Those that are against a role to Municipalities provided the following comments:

a) Do not play or should not play a role - Details



b) Municipalities still play a role, which one?



Municipalities still play a role, which one?

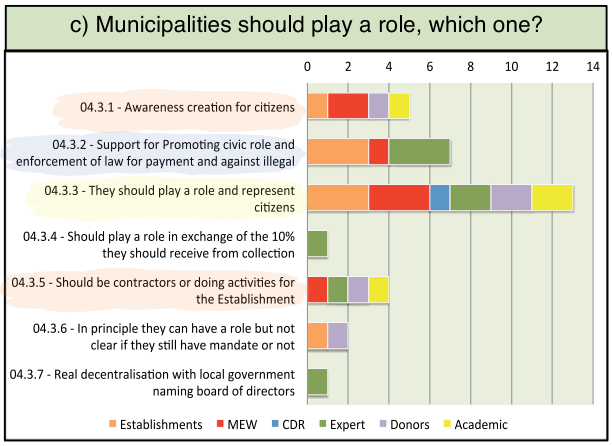
Many actors recognized that maintenance and extensions of networks are in many cases still financed by Municipalities because of lack of resources of Establishments.

Municipalities play an active role in directly contacting donors and implementing projects (this is highlighted in particular by interviewed donors). Many stressed that Municipalities still play a role only when are still present Water Committees that did not handover the infrastructures to Establishments.

Some respondents highlighted that involvement of Municipalities is larger in rural areas.

Interesting to notice that many interviewees from Establishments are promoting a role for Municipalities and the majority of them declare that collaboration is quite good.

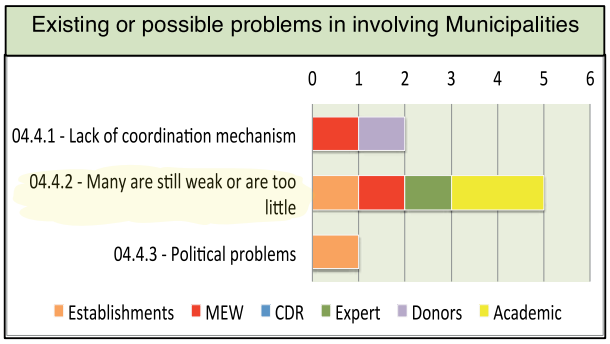
These relations between Establishments and Municipalities will be analyzed with further questions later.



Municipalities should play a role, which one?

Between those that declared that Municipalities should have a role, the majority focused on:

- Representing citizens in front of the Establishments;
- Promoting payments to Establishments and supporting in enforcing law against illegal connections;
- They should contribute in creating awareness to citizens.
- Some respondents proposed that Municipalities play a direct role in the implementation of activities like a sort of subcontractor for the Establishments;



Existing or possible problems in involving Municipalities

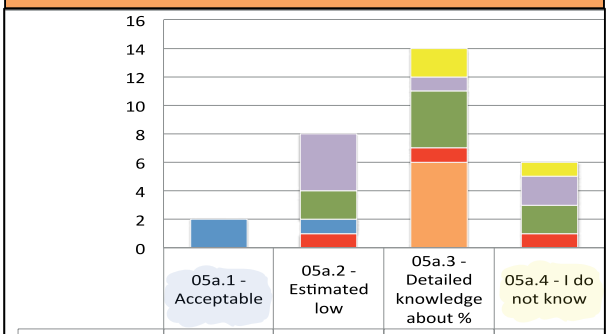
Some actors mentioned as an existing problem in Municipalities' involvement in water sector, the impossibility of a standardized approach as many Municipalities <u>are too small or weak</u> to collaborate with Establishments (obviously depending on the role expected from them).

It is important to notice the actual <u>lack of whatever formal mechanism for collaboration</u> between Municipalities and Establishments.

Q.05 Subscriptions to Establishments

Exact formulation of the Question: *What is the percentage of subscribers in your region (or national level)? Why do you think people are not subscribing?*

Q.5.a - Estimation of % of subscribers



	05a.1 - Acceptable	05a.2 - Estimated low	05a.3 - Detailed knowledge about %	05a.4 - I do not know
Academic	0	0	2	1
Donors	0	4	1	2
Expert	0	2	4	2
CDR	2	1	0	0
MEW	0	1	1	1
Establishments				

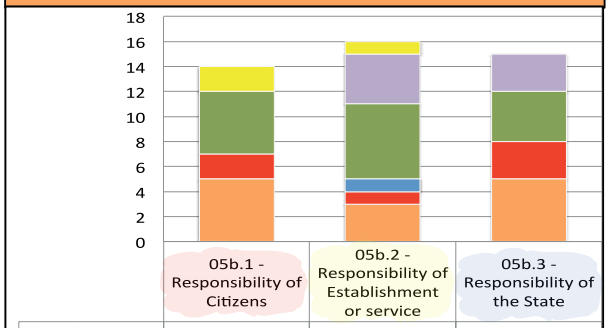
Estimation of % of subscribers

Objective of this question was to understand what was the attention paid by different actors to the problem of low subscriptions rates in Lebanon (ranging between 35% in Bekaa, and 58% in North).

The majority of respondents are aware that rates of subscriptions are low. Water Establishments are able to give precision about the %.

A relevant percentage of respondents (approx. 20%) do not know what is the situation about subscriptions in Lebanon. Few of them (only from CDR) consider it at acceptable levels.

Q.5.b - Reason for low subscription rates



	05b.1 - Responsibility of Citizens	05b.2 - Responsibility of Establishment or service	05b.3 - Responsibility of the State
Academic	2	1	0
Donors	0	4	3
Expert	5	6	4
CDR	0	1	0
MEW	2	1	3
Establishments	5	3	5

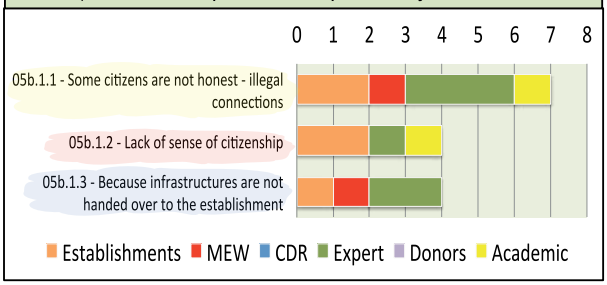
Reason for low subscription rates

The responsibilities for low subscription rates can be considered as equally distributed between:

a. Citizens;
b. Establishments;
c. General problem of Lebanese State;

It is Interesting to note that the different categories of respondents are equally distributed between the 3 answers (apart donors and academics) and that institutions recognize their proper responsibility.

a) Low subscriptions - Responsibility of Citizens

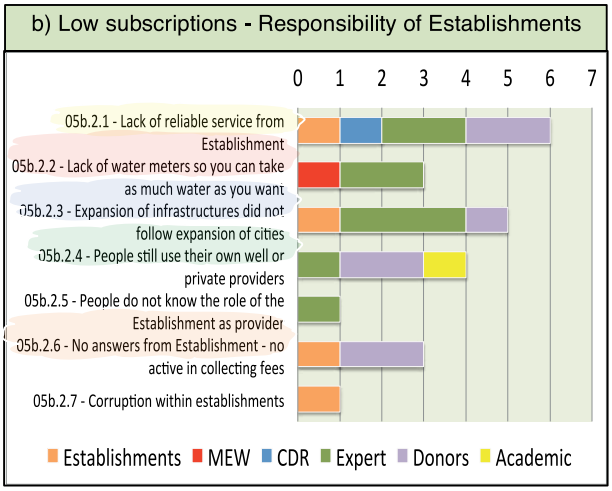


a) Low subscriptions - Responsibility of Citizens

Those that focused in their answer on responsibility of citizens stressed that illegal connections are the main problem.

Other respondents highlighted:

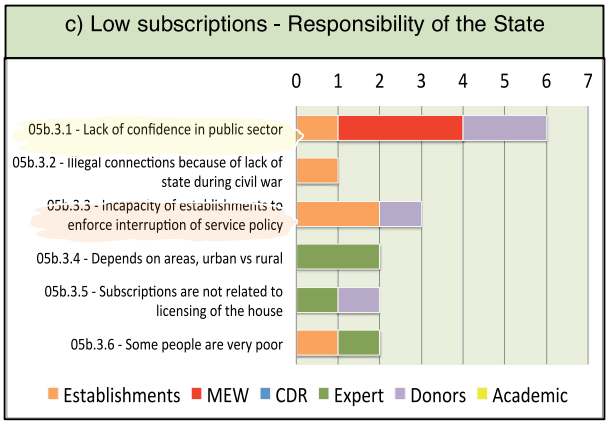
- General lack of sense of citizenship around the whole country;
- Some infrastructures are still not handed over to the Establishments and Municipalities are still managing them (refer to question 4).



b) Low subscriptions - Responsibility of Establishments

For those that insisted on the responsibility of the Establishments, the main reasons are:

- Lack of reliable services;
- Infrastructures did not follow the expansion of the cities (extensions of networks are by most of respondents supposed to be responsibility of Establishments)
- People use their own wells or alternative service providers and do not have interest to rely on public services;
- Lack of water meters and incapacity to manage the demand;
- Establishments are not active in collecting subscriptions.



c) Low subscriptions - Responsibility of the State

Respondents that mentioned as reason for low subscription something more related to general situation of Lebanon indicated that lack of confidence in public sector is spread all around the Country and is not related only to water sector.

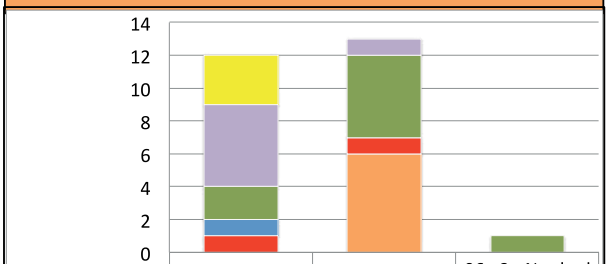
Some actors mentioned the incapacity of the Establishments to enforce interruption of service for non-payers or illegal subscribers.

This incapacity in enforcing law, has been considered as a general deficiency of public sector, due to problems that are going beyond the only water sector.

Q.06 Payments of water fees

Exact formulation of the Question: *a) What is the percentage of collection rate in your region (or national level)? Why do you think people are/are not paying?*

Q.6.a - Estimation of % of Payers



	06a.1 - Estimated low	06a.2 - Detailed knowledge about %	06a.3 - Not bad if we consider just the subscribers
Academic	3	0	0
Donors	5	1	0
Expert	2	5	1
CDR	1	0	0
MEW	1	1	0
Establishments	0	6	0

Estimation of percentage of Payers

The majority of respondents are aware of low payment rates for water sector and Water Establishments, among others, have a clear view about the pourcentage.

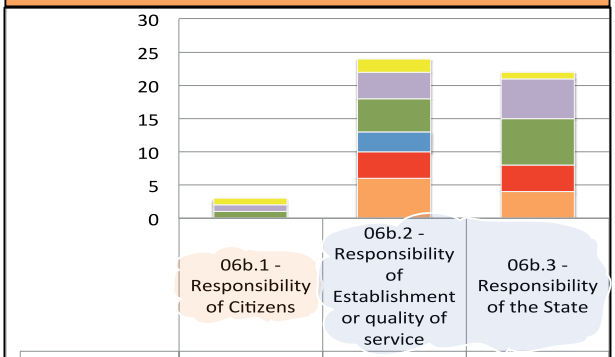
The graph shows similar pattern of responses between subscription and payments *(question Q5).*

It should be stressed that many of the interviewees practically consider payments and subscriptions as two similar aspects of the same problem that depend on same causes.

Most of the interviewees that replied "I do not know" to the question about subscriptions, did not reply at all to this one.

Some respondents used this question to clarify better their position and to provide more details even in relation to the previous one.

Q.6.b - Reasons for low payment rate

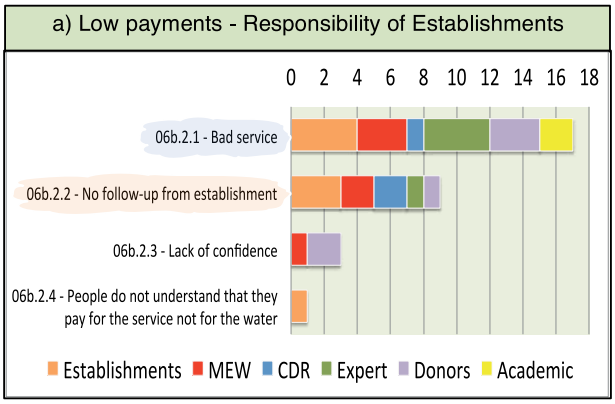


	06b.1 - Responsibility of Citizens	06b.2 - Responsibility of Establishment or quality of service	06b.3 - Responsibility of the State
Academic	1	2	1
Donors	1	4	6
Expert	1	5	7
CDR	0	3	0
MEW	0	4	4
Establishments	0	6	4

Reasons for low payment rate

Interesting to note that in relation to payment the responsibilities attributed to citizens are much lower (mainly lack of citizenship) while responsibilities are equally attributed between :

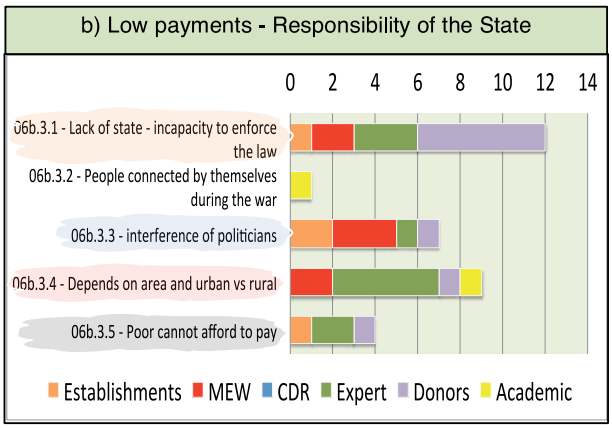
a. Establishments;
b. General problems of Lebanese State.



a) Low payments - Responsibility of Establishments

Reasons for low payments attributable to Establishments are mainly related to:

- Bad service provided;
- Not enough follow-up for payments from the Establishments.



b) Low payments - Responsibility of the State

Similar answers to those related to subscriptions (Q.5) are obtained by those respondents that stressed a general responsibility of Lebanese State.

It is interesting to notice that incapacity to enforce the law is mentioned also here but that an important number of respondents are highlighting interference of politicians as cause for low-payment.

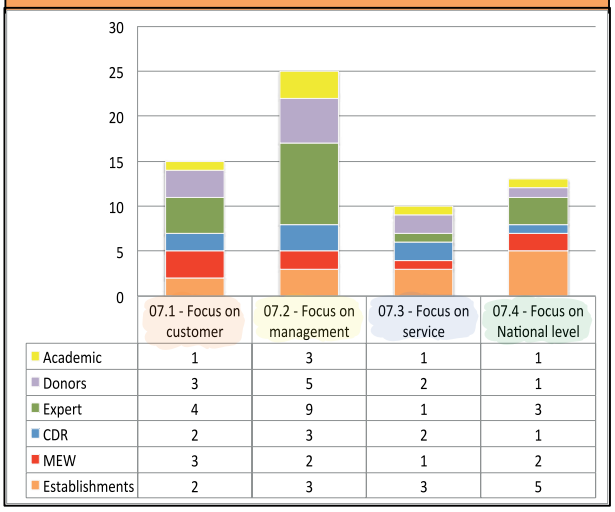
Rate of payment seems to be more dependent on the region and on the difference between rural (lower) and urban (higher) areas.

Higher number of respondents *(in relation to question about subscriptions)* is mentioning that poor cannot afford to pay.

Q.07 Recommendations for improving cost recovery at Establishments

Exact formulation of the Question: *What would you recommend as a strategy for improving water cost recovery at Establishment level?*

Q.7 - Recommendations for improving cost recovery at Establishment level



	07.1 - Focus on customer	07.2 - Focus on management	07.3 - Focus on service	07.4 - Focus on National level
Academic	1	3	1	1
Donors	3	5	2	1
Expert	4	9	1	3
CDR	2	3	2	1
MEW	3	2	1	2
Establishments	2	3	3	5

Recommendations for improving cost recovery at Establishment level

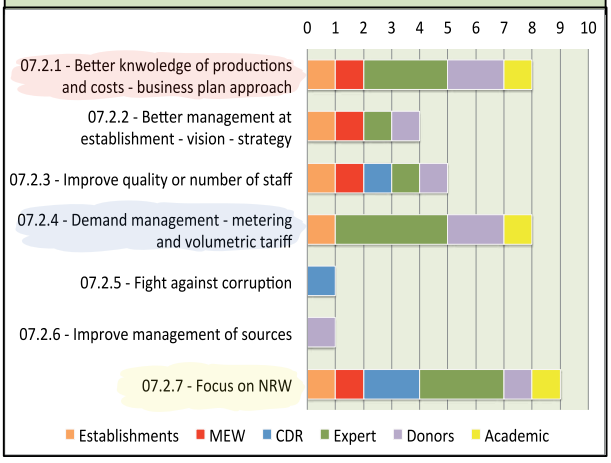
The respondents gave articulated answers that have been classified in 4 main categories in relation to the aspects they were focusing on.

Some of the answers have been classified under different categories (the answer of a single actor can be classified in more categories but it is not possible to count the same actor two times on the same category).

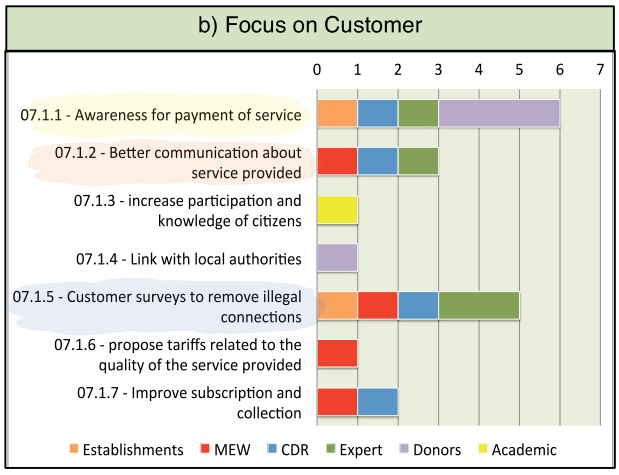
The majority of the answers considered <u>improving the management</u> as the most important aspect to be taken in consideration.

Recommendations are numerous and have to focus on different aspects.

a) Focus on Management



b) Focus on Customer



a) Strategy - Focus on management

The majority of the respondents recommended investing on technical aspects of the management like:

- <u>Reduction of NRW</u> (Non Revenue Water), meaning reduction of physical and commercial losses to reduce the gap between water produced and water paid;
- Metering and <u>application of volumetric tariff</u> (to introduce a management of the demand).

The two answers have not been classified together because for some actors investing in NRW does not mean necessarily the introduction of volumetric tariff, but just better measurement of production and consumptions.

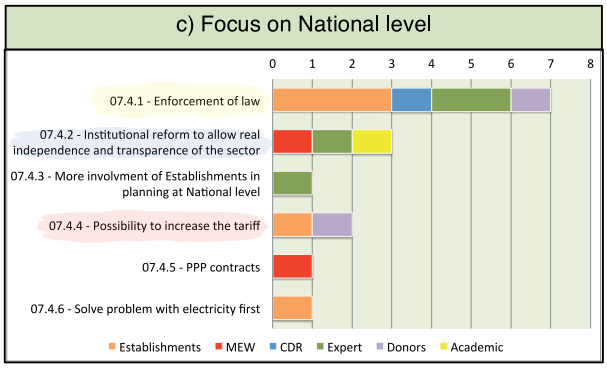
Better knowledge of production costs and quantities are considered essential to define more effective business plans.

b) Strategy - Focus on customer

The majority stressed the need for creating awareness about payment of the service.

Customer surveys (update of customer DB) is mentioned as a practical action to remove illegal connections.

Improving communication about service provided is also mentioned by few actors.

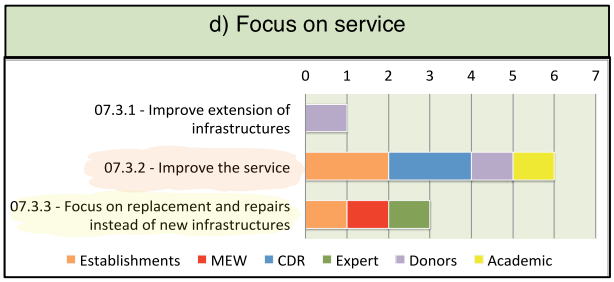


c) Strategy - Focus on National Level

Within this category have been included all the recommendations that are involving major changes in the Sector at Ministerial level or in the Policy of the country. These recommendations are going beyond the reach of the Establishments alone.

Enforcement of law is considered the most important factor that should be obtained in Lebanon to support the sector.

Important are also the comments related to the need of reforms for allowing independence and transparency in the sector and the possibility for Establishments to increase the tariffs.



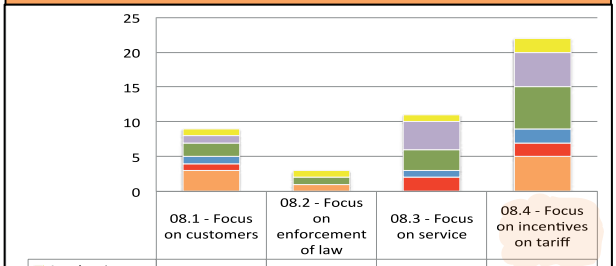
d) Strategy - Focus on service

While the majority focused in a general comment about improvement of the service, it is worth to mention the comment made by some of the respondents that proposed to invest more on replacement and repairs of existing infrastructure instead that keeping constructing new infrastructures.

Q.08 Incentives for improving subscriptions and payments

Exact formulation of the Question: *Would you recommend any incentive for improving subscription/ payment?*

Q.8 - Incentives for improving subscriptions/payments



	08.1 - Focus on customers	08.2 - Focus on enforcement of law	08.3 - Focus on service	08.4 - Focus on incentives on tariff
Academic	1	1	1	2
Donors	1	0	4	5
Expert	2	1	3	6
CDR	1	0	1	2
MEW	1	0	2	2
Establishments	3	1	0	5

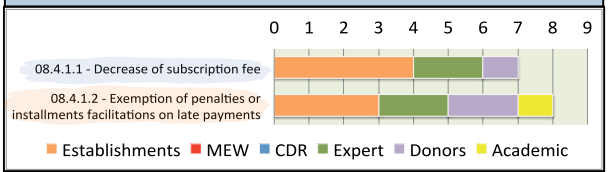
Incentives for improving subscriptions/ payments

Also for this question, the replies have been categorized upon the main focus they propose.

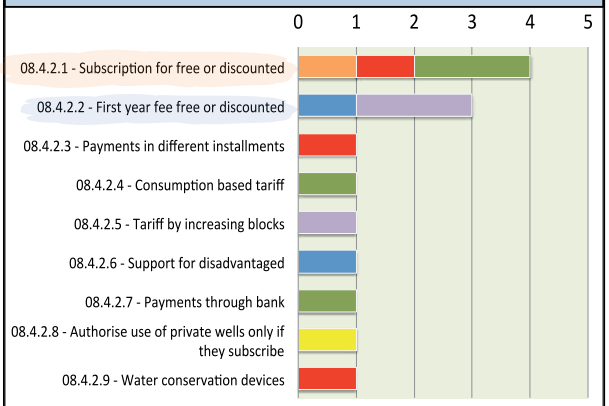
The majority recommended promoting <u>incentives on tariff to attract customers</u> and achieve higher rates of subscriptions and payments.

a) Focus on incentives through tariff

Incentives already tried



Incentives proposed



a) Focus on Incentives through tariff

<u>Reduction of subscription fees, exemption from penalties for late payments or facilitations like dividing in installments</u> the same have been already tried with specific campaigns in the past by most of the Establishments.

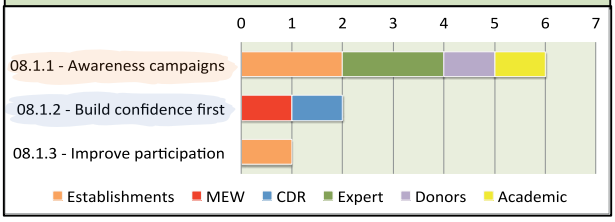
Upon the respondents, the results were <u>slightly positive</u> but for sure not decisive in addressing the problem of low subscriptions.

Some respondents propose drastic incentives like <u>eliminating subscription fee</u> or <u>discounting</u> its total amount.

Others think that this incentive can be promoted <u>just for the first year</u> in order to earn customers taking example from marketing strategies used by private companies.

The consumption based on tariff is recommended only once.

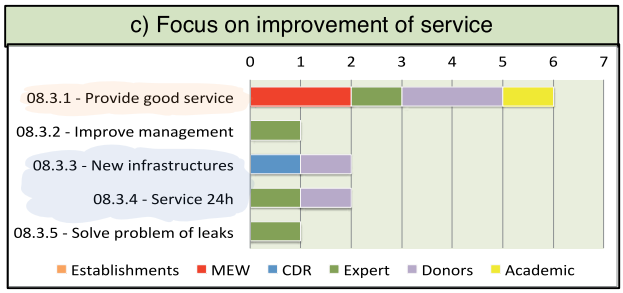
b) Focus on citizens/customers



b) Focus on citizens/customers

Respondents who focused on customers highlighted that <u>awareness campaigns</u> are the best way to achieve tangible results.

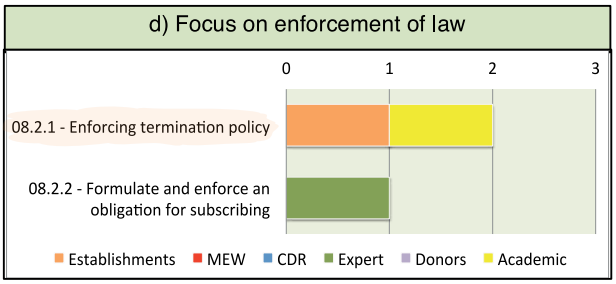
<u>Building of confidence as the first step</u> before pretending the subscription/payment is also mentioned.



c) Focus on improvement of service

Simple provision of good service, as an incentive fro promoting subscription is the most frequent answer.

Interesting to notice that some mentioned as a way to improve subscription the provision of new infrastructures and others the provision of 24h service.



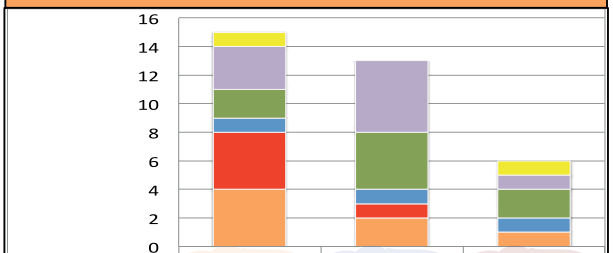
d) Focus on enforcement of law

Few focused on enforcement of law like the application of termination policy as the best way to increase payments.

Q.09 Domestic Water Meters

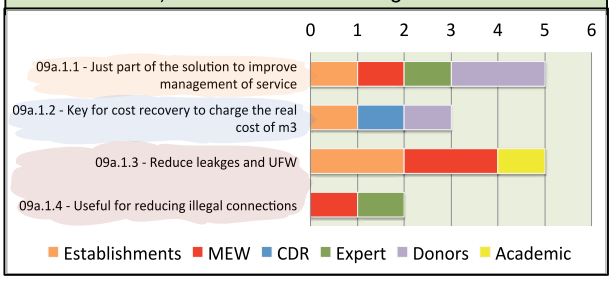
Exact formulation of the Question: *In national documents it seems that many of the problems of cost-recovery could be resolved by installing domestic water meters. What do you think is the real contribution they would provide?*

Q.9 - Effective contribution of domestic water meters

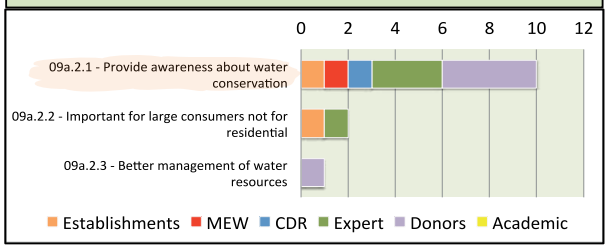


	09a.1 - In water management	09a.2 - in water conservation	09a.3 - In terms of equity
Academic	1	0	1
Donors	3	5	1
Expert	2	4	2
CDR	1	1	1
MEW	4	1	0
Establishments	4	2	1

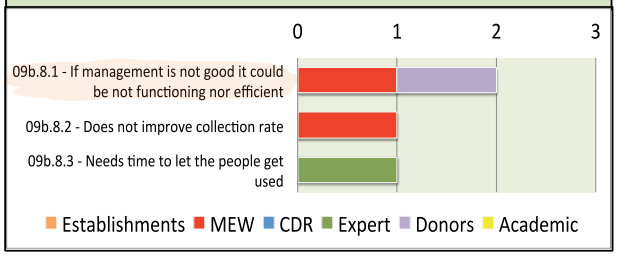
a) Effects in water management



b) Effects in water conservation



Possible problems in installing water meters



Effective contribution of domestic water meters

Practically all the interviewees support the policy of installation of water meters and they identified different aspects where water meters can bring positive effects.

Large number of replies stressed the impact on water management and in water conservation, while few mentioned also aspects related to increase of equity in the service.

a) Water meters - Effects in water management

Respondents have considered introduction of water meters as just one element, among many others, that could contribute to improve management of water sector.

Some actors consider water meters as the key to reduce UFW (unaccounted for water) for the Establishments and to solve the problem of illegal connections.

Others stressed the importance of installation (and reading) of domestic water meters as one of the essential elements enabling to charge the real cost of m3 to final users.

b) Water meters - Effects in water conservatio

Many stressed that water meters would be a very effective awareness tool. Possible problems in installing domestic water meters

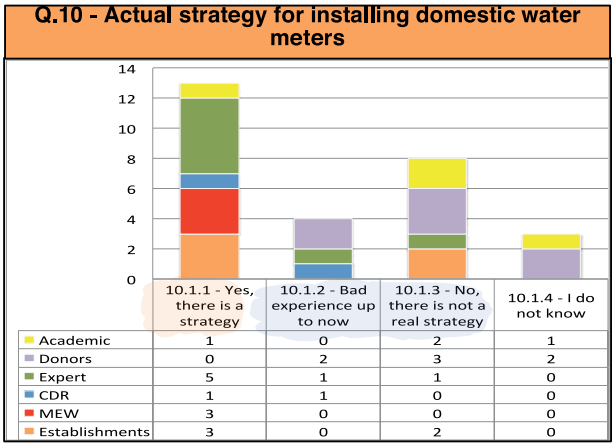
Possible problems in installing domestic water meters

Few respondents focused instead on possible negative aspects related with water meters installation and it has been considered important to report them.

If management of water meters and follow-up is not good, the installation could be even counterproductive, in terms of efficiency and functionality of the system.

Q.10 Actual strategy for installing domestic water meters

Exact formulation of the Question: *What is the strategy for installing domestic water meters? How did it go so far and when the volumetric tariff has been/will start to be applied? What was/is expected the level of acceptation?*

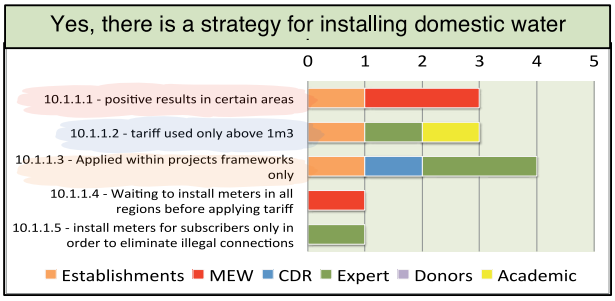


	10.1.1 - Yes, there is a strategy	10.1.2 - Bad experience up to now	10.1.3 - No, there is not a real strategy	10.1.4 - I do not know
Academic	1	0	2	1
Donors	0	2	3	2
Expert	5	1	1	0
CDR	1	1	0	0
MEW	3	0	0	0
Establishments	3	0	2	0

Actual strategy for installing domestic water meters

The majority of interviewees declare that there is an existing strategy for installing water meters in Lebanon.

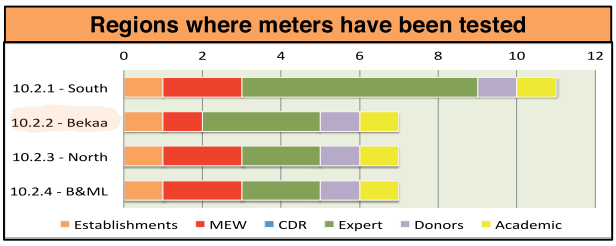
Interesting to notice that a relevant number of respondents have a completely different opinion while some others just comment that the experiences till now were not positive at all.



There is a strategy

Those affirming that a strategy is in place commented that:

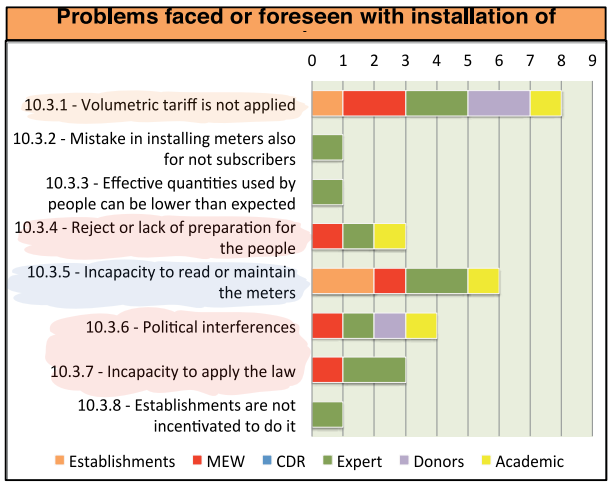
- Installation is done just within the framework of new projects, not on already existing infrastructures;
- There have been some positive results in certain areas;
- A volumetric tariff for the consumptions above 1m3/day is already applied in some areas.



Regions where meters have been tested

The majority of experiences have been held in South Lebanon.

It can be noticed that all the Regions seem to have already tested installation of meters.



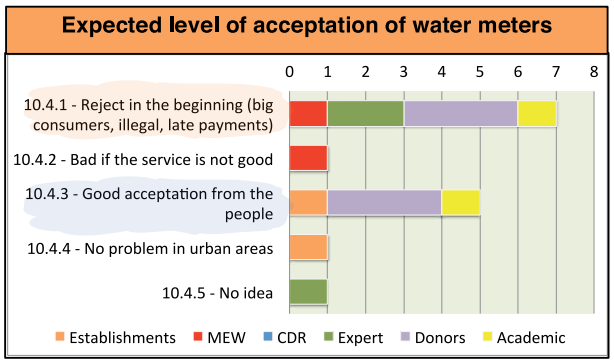
Problems with installation of water meters

Problems already experienced in the past, or foreseen for the future when installing water meters, are:

- Volumetric tariff is not applied consequently;
- Establishments are not able to make follow up (read and maintain meters).

Other problems, even if coming only by few actors, are worth to be mentioned:

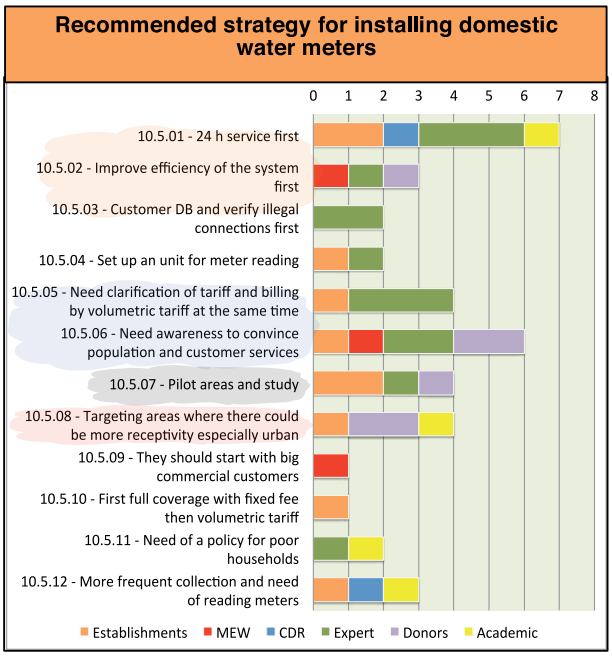
- People will reject meters as they lack preparation;
- Political interferences will hinder the process;
- Incapacity to apply the law (intended as difficulties in enforcing termination policy);



Expected level of acceptation of water meters

The majority thinks that citizens will reject or in any case their level of acceptations will be very low especially in the beginning.

Others have a completely opposite opinion, among them Water Establishments, considering that the acceptation will be good or that at least in urban areas there will not be any problem.



Recommendations for installing water meters and applying volumetric tariff

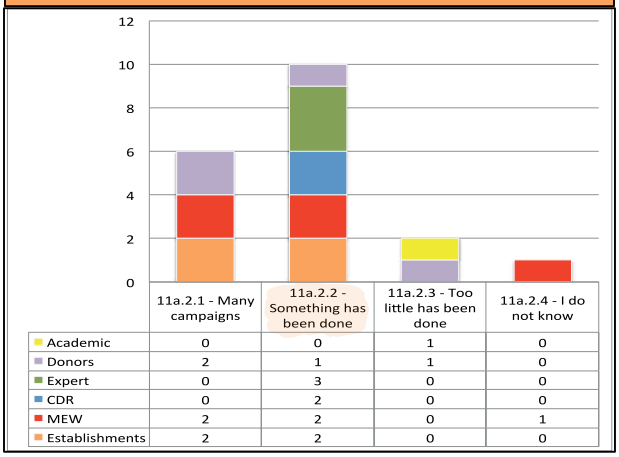
The respondents made various recommendations in how to set-up a strategy for installing domestic water meters:

- Necessity to provide 24h service before applying the volumetric tariff while others just recommended a generic improvement of the service;
- Need of an awareness campaign to convince the population and to provide clarifications about tariff structure and its application;
- Differentiate initial targets of the strategy by focusing first on urban areas that could be more receptive.
- Testing the strategy first on pilot areas and capitalize these experiences before larger campaigns are launched.

Q.11 a) Awareness campaigns for Water Conservation

Exact formulation of the Question: *What kind of awareness campaigns about water conservation have been done up to now? Do you think they have been useful? What would you recommend for creating awareness?*

Q.11.a - Quantity of Water conservation campaigns done up to now



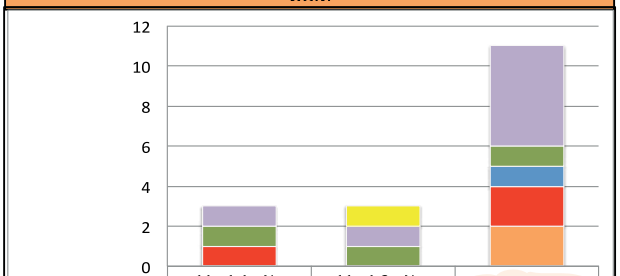
	11a.2.1 - Many campaigns	11a.2.2 - Something has been done	11a.2.3 - Too little has been done	11a.2.4 - I do not know
Academic	0	0	1	0
Donors	2	1	1	0
Expert	0	3	0	0
CDR	0	2	0	0
MEW	2	2	0	1
Establishments	2	2	0	0

Water conservation campaigns

The majority of respondents consider that something has been done in terms of awareness about water conservation.

Some consider that a relevant number of campaigns were conducted up to date, while only few think the opposite.

Water conservation - Impact of campaigns done up to now



	11a.1.1 - No feedback about the impact	11a.1.2 - Not useful or too scattered	11a.1.3 - Useful
Academic	0	1	0
Donors	1	1	5
Expert	1	1	1
CDR	0	0	1
MEW	1	0	2
Establishments	0	0	2

Impact of water conservation campaigns up to now

The majority think that awareness campaigns for water conservation done up to date have been useful.

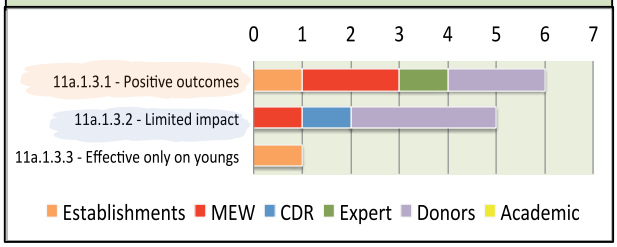
Few commented that the campaigns done up to date have not been useful or in any case too scattered to have a real impact.

Same number of respondents is not aware about possible utility of these campaigns, as the impact has never been evaluated.

Interesting to note that people that replied to this question are mainly the same actors that have been organizing or financing these campaigns (establishment, Ministry and donors).

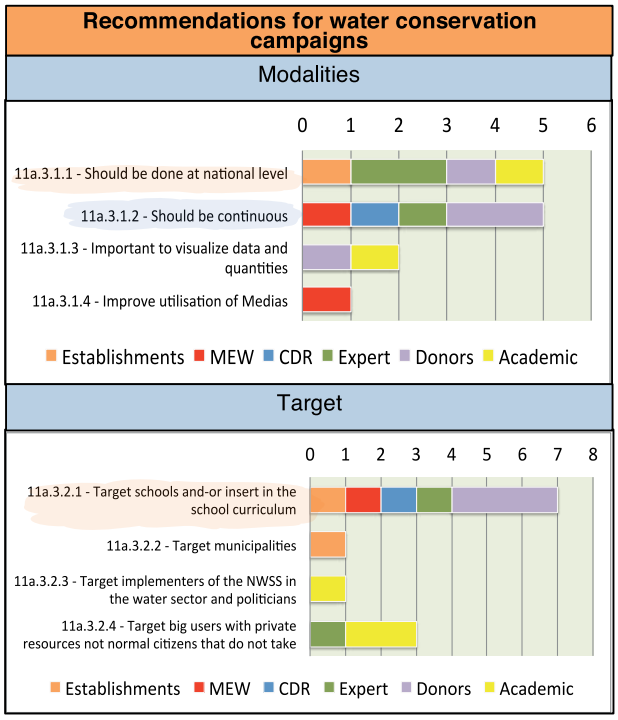
If just few experts of the sectors have been reached this could be considered as an indicator of low impact of these campaigns.

Comments about useful campaigns



Comments about useful campaigns

Even between those that declared that campaigns have been useful, a relevant number still thinks that the impact was quite limited.



Recommendation for water conservation campaigns

a) Modalities

The majority thinks that campaigns should be at national level.

Others stressed that message should be continuous; the strategy cannot be effective if promoted through isolated and not coordinated campaigns.

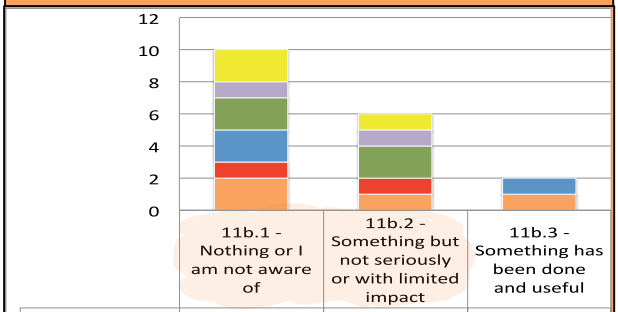
b) Target

When requested who should be targeted, the majority propose students suggesting that water conservation is inserted in the school curricula by Ministry of Education.

Q.11 b) Awareness campaigns for Water Cost recovery

Exact formulation of the Question: *What kind of awareness campaigns about water cost recovery have been done up to now? Do you think they have been useful? What would you recommend for creating awareness?*

Q.11.b - Cost recovery campaigns - What has been done up to now?



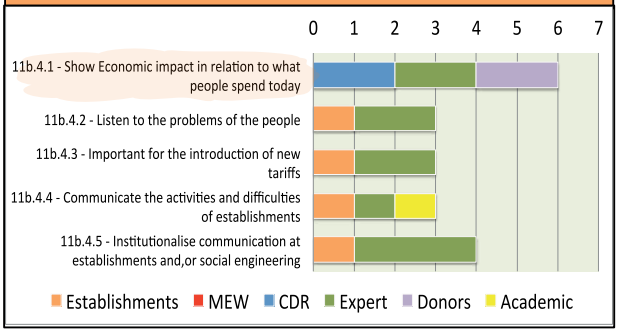
	11b.1 - Nothing or I am not aware of	11b.2 - Something but not seriously or with limited impact	11b.3 - Something has been done and useful
Academic	2	1	0
Donors	1	1	0
Expert	2	2	0
CDR	2	0	1
MEW	1	1	0
Establishments	2	1	1

Cost recovery campaigns

The majority declares that almost nothing has been done at their knowledge.

Others are aware of some kind of campaigns but still consider that what has been done is too little and had a limited impact.

Recommendations for cost recovery campaigns



Recommendations for cost recovery campaigns

The majority proposes to show to citizens the possible impact in economic terms in relation to what they actually spend.

Other recommendations for cost recovery campaigns are quite uniformly distributed between:

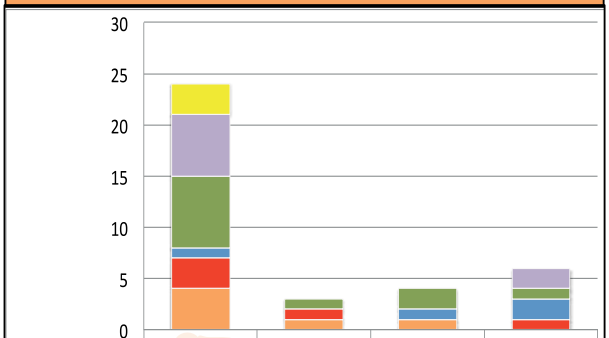
- Design awareness campaigns after having listened to citizens problems;
- Launch cost recovery campaigns to facilitate the introduction of new tariffs;
- Communicate achievements but also existing difficulties of Establishments, in order to increase transparency in the management;
- Communication should be more institutionalized and be conducted directly by the Establishments making use of specialized staff.

2.2.2 Chapter 2 - Customer Services

Q.12 Customer services for water sector

Exact formulation of the Question: *What do you think about customer services in water sector provided here in Lebanon?*

Q.12 - Customer Services - Actual situation



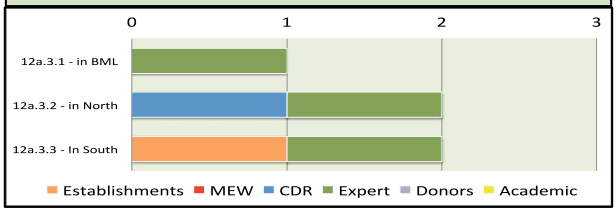
	12a.1 - Bad service	12a.2 - It is under development	12a.3 - It is good	12a.4 - I do not know
Academic	3	0	0	0
Donors	6	0	0	2
Expert	7	1	2	1
CDR	1	0	1	2
MEW	3	1	0	1
Establishments	4	1	1	0

Customer Services - Actual situation

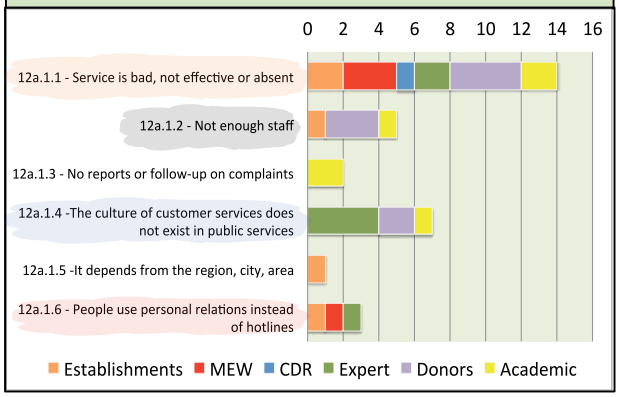
The large majority of respondents think that customer services are bad in Lebanon.

Very few consider them as good while some are stressing in positive terms the fact that they are still under development but in any case improving. Here below the frequency of the few positive answers divided by Establishments.

Good customer services, where?



Bad customer services, why?



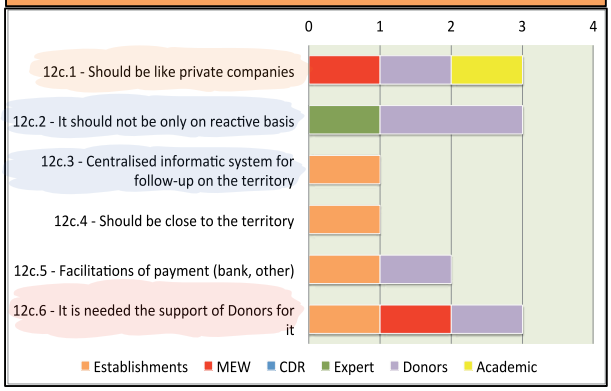
Bad customer services, why?

Most of the interviewees think that customer services are just practically absent or, when existing, not efficient at all.

The most important causes have been indicated in lack of dedicated personnel, but also lack of culture of customers' services in the public sector around the whole Country.

This lack of culture is also from citizens side, because when hotline are installed, people still prefer to rely on personal connections that on formal channels for obtaining assistance.

Recommendations for improving customer services



Recommendations for improving customer services

The recommendations provided suggest to change completely the approach of Establishments customer services by:

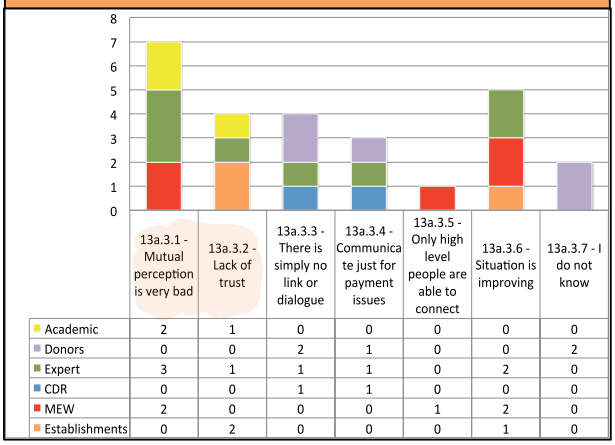
- Taking private companies as a model and just imitate their practices;
- Being proactive face to customers and do not just act on reactive basis when problems arise;

For improving customer services a support from donors is considered essential by some respondents.

Q.13 a) Relations between Establishments and Citizens/Customers

Exact formulation of the Question: *What do you think about links between Establishments and the customers?*

Q.13.a - Mutual perception Establishments-Citizens



	13a.3.1 - Mutual perception is very bad	13a.3.2 - Lack of trust	13a.3.3 - There is simply no link or dialogue	13a.3.4 - Communicate just for payment issues	13a.3.5 - Only high level people are able to connect	13a.3.6 - Situation is improving	13a.3.7 - I do not know
Academic	2	1	0	0	0	0	0
Donors	0	0	2	1	0	0	2
Expert	3	1	1	1	0	2	0
CDR	0	0	1	1	0	0	0
MEW	2	0	0	0	1	2	0
Establishments	0	2	0	0	0	1	0

Relations between Establishments and Citizens/Customers

The Majority considers the mutual perception between Establishment and citizens as very bad. A certain number of actors are affirming that this relation is anyhow improving.

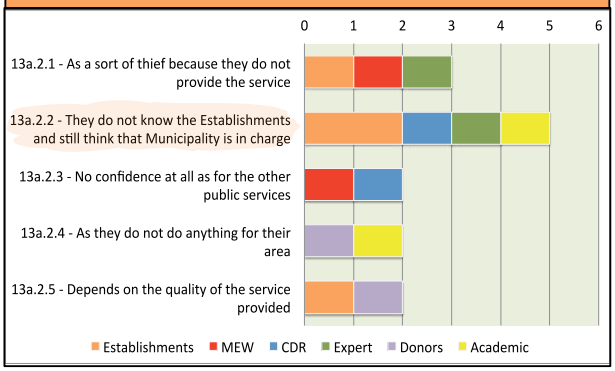
Some commented that there is no dialogue at all, or that this is just limited to payment issues.

"Lack of trust" is specifically mentioned by some of the interviewees.

Some actors have been more specific and provided more details about this relationship.

To notice that most of the answers focused on how citizens perceive the Establishment and very few in how the Establishments perceive citizens.

Establishments seen by Citizens



Establishment seen by Citizens/Customers

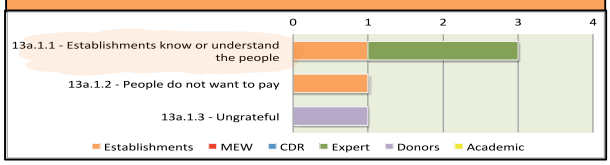
Majority affirms that many citizens are not even aware of the existence of Establishments and they still think that Municipality is in charge.

As for all other public services, there is a complete lack of confidence.

Some stressed that the judgment is depending mainly by the quality of services provided.

Where service is poor citizens see the Establishments as a sort of thief because they ask money and do not deliver service.

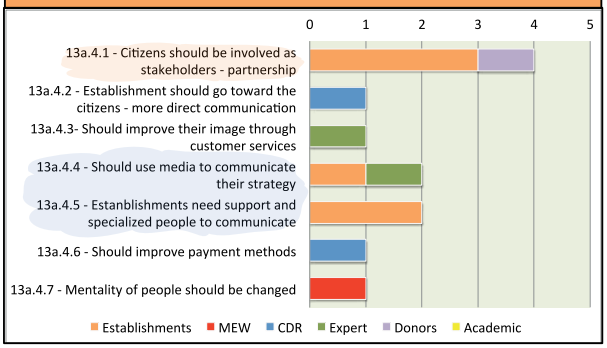
Citizens seen by the Establishment



Citizens/Customers seen by Establishments

The few that focused on this aspect think that Establishments know or in any case understand the people and their problems.

Recommendations to improve relations



Recommendations to improve relations

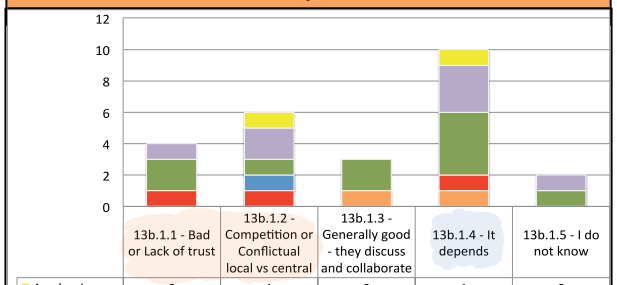
When requested how to improve this mutual perception, the most frequent recommendation is to consider and involve citizens as stakeholders in the sector and to use more direct channels of communication.

Some propose to use media in a better way to communicate the strategy of the Establishment; for achieving this, it is stressed the importance to use professional people experienced in communication.

Q.13 b) Relations between Establishments and Municipalities

Exact formulation of the Question: *What do you think about links between establishments Municipalities?*

Q.13.b - Relations between Establishments and Municipalities



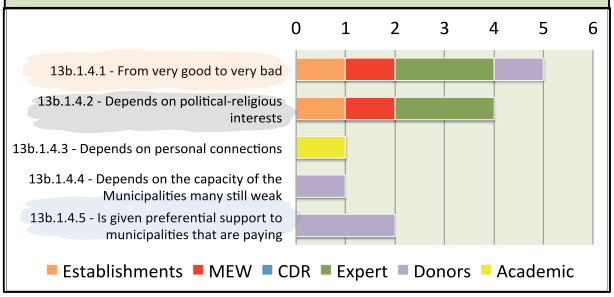
	13b.1.1 - Bad or Lack of trust	13b.1.2 - Competition or Conflictual local vs central	13b.1.3 - Generally good - they discuss and collaborate	13b.1.4 - It depends	13b.1.5 - I do not know
Academic	0	1	0	1	0
Donors	1	2	0	3	1
Expert	2	1	2	4	1
CDR	0	1	0	0	0
MEW	1	1	0	1	0
Establishments	0	0	1	1	0

Relations between Establishments and Municipalities

When requested to describe the relations between Establishment and municipalities, replies are various but majority indicates negative aspects like lack of trust or a relation of competition representing the conflict between central and local.

Very few have seen this relation as positive and the majority responded with "it depends…".

Quality of Relation depends on what?



Quality of Relation depends on what?

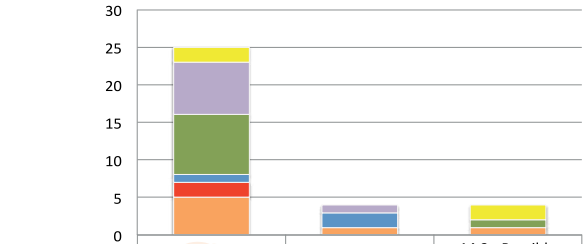
Conditionality means that the type of relation:

- Can vary completely from very good to very bad: there is no general rule;
- it is subject to political-religious interests or affiliations;
- It is good if the customers from that Municipality are paying their water bill;

Q.14 Union of Municipalities can have a role in the water sector?

Exact formulation of the Question: *What about solutions that could even involve more Municipalities in order to forward to the Establishments the needs, the constraints and to create more linkage between utility and customers?*

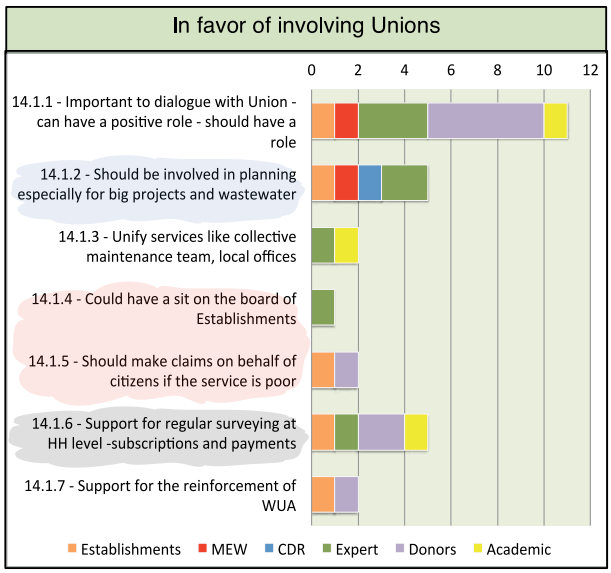
Q.14 - Union of municipalities – can have a role?



	14.1 - In favor of involving Unions	14.2 - No need, not in their mandate	14.3 - Possible problems with Unions
Academic	2	0	2
Donors	7	1	0
Expert	8	0	1
CDR	1	2	0
MEW	2	0	0
Establishments	5	1	1

Union of municipalities – can have a role?

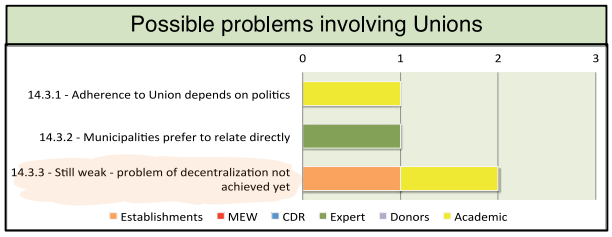
Majority of interviewees is in favor of involving Union of Municipalities in the sector.



In favor of involving Unions in water sector

The majority of those promoting a role for the Union, did not detailed and specific modality, while others recommended specific roles like:

- Involvement in planning big projects involving more municipalities, especially for wastewater sector;
- Could be the basis for follow-up at household level for subscriptions and payments. A sort of supporting local offices for Establishments.
- Can represent the interests of their citizens in a more effective ways than single municipalities and an expert suggested that representatives of Unions can directly sit on boards of Establishments;



Possible problems involving Unions

Few respondents focused instead on negative aspects of involving union specifying that it is not in their mandate and these new structures are still too weak.

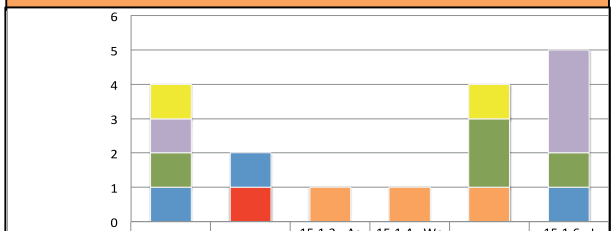
Worth to be mentioned also the comment of another actor that stressed the fact that Unions are not always able to represent the whole territory as too often Municipalities adhere just on the basis of political affiliations and not on simple geographic criteria.

2.2.3 Chapter 3 - Calculation Of The Tariff

Q.15 OPEX Costs and Tariff

Exact formulation of the Question: *Do you think that water fees as are fixed now will be sufficient to cover OPEX costs? What should be the coverage level? When is it expected to be reached?*

Q.15.a - Expected breakeven for OPEX costs



	15.1.1 - Never	15.1.2 - Long time	15.1.3 - As soon as volumetric tariff is applied	15.1.4 - We cannot say until updated busines plan	15.1.5 - Will be reached in approx 5 years	15.1.6 - I have no clear idea about this subject
Academic	1	0	0	0	1	0
Donors	1	0	0	0	0	3
Expert	1	0	0	0	2	1
CDR	1	1	0	0	0	1
MEW	0	1	0	0	0	0
Establishments	0	0	1	1	1	0

Expected breakeven for OPEX costs with actual tariff

This section of questions about water tariff gives a good representation how opinions about cost recovery problems in Lebanon are **various and often contradictory.**

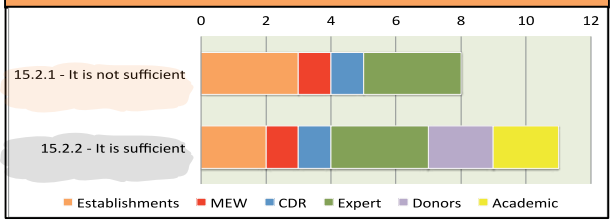
With this question interviewees have been requested to focus only on coverage of Operation and Maintenance costs (OPEX or O&M) *(without considering capital costs, CAPEX, that will be analyzed by following questions).*

Opinions vary between

- It will be reached in the next five years;
- Just in a long time;
- Never.

A relevant number of interviewees are <u>not able to reply or make a guess</u> about this question.

Is actual tariff sufficient to cover OPEX costs?

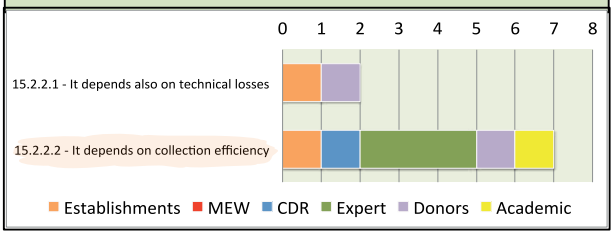


Is actual tariff sufficient to cover OPEX costs?

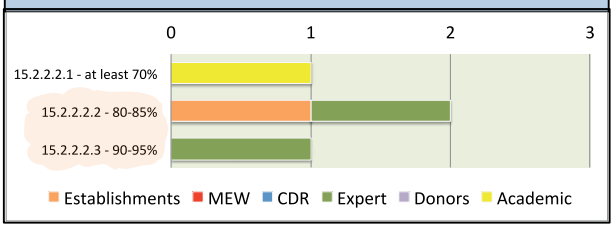
The question has been then more specific on the existing tariff, and it is evident that opinions are more or less <u>equally divided between it is sufficient and it is not sufficient</u> to cover OPEX costs (slightly higher the number of those considering actual tariff as sufficient).

It should be noted that opinions are also <u>equally shared between the different categories of respondents</u> (apart Donors and Academics)

Actual tariff could be sufficient but depends on

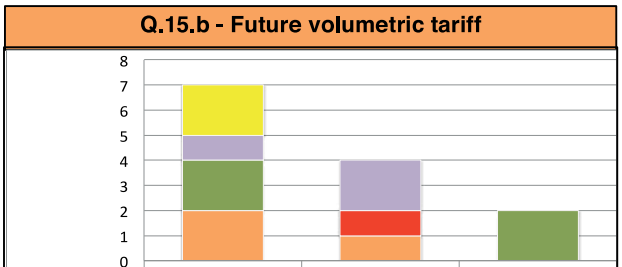


It depends on collection efficiency



Actual tariff could be sufficient but depends on

Most of those declaring that actual tariff is sufficient, pointed out that the adequateness is mainly depending on collection efficiency that should be in most of the cases above 80% (if not 90-95%).



	15.3.1 - Should be sufficient as properly calculated with scientific method	15.3.2 - Nobody can tell because it is not build on real costs	15.3.3 - Not sure will be sufficient but is a good start
Academic	2	0	0
Donors	1	2	0
Expert	2	0	2
CDR	0	0	0
MEW	0	1	0
Establishments	2	1	0

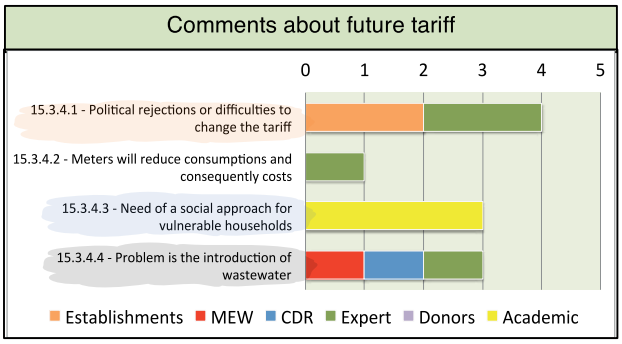
Future volumetric tariff

A specific question has then been asked in relation to the future volumetric tariff that has been under study during the last few years.

Between those that replied, declaring to be aware of the debate about future tariff, the majority is confident that the tariff should be sufficient because it is based on scientific studies.

A relevant number replied instead that it is not possible to say, as all the calculations for tariffs are based just on assumptions and not on real costs.

Some experts replied that even if it will not be sufficient, as it is actually difficult to verify with current situation, it is in any case a good start that is going in the right direction.



General comments about future tariff

Some comments have been reported about future volumetric tariff stressing that there will be political rejection and that difficulties in applying the new tariff shall be expected in any case.

Others stated that the real problem with introduction of new tariffs will be especially when wastewater tariff will be introduced *(this aspect will be covered with question n.24).*

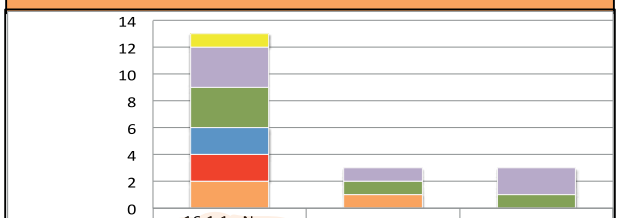
Interesting to notice that just people from Universities proposed to insert a social approach for vulnerable households when inserting a volumetric tariff.

When requested to specify it, the answer was the introduction of an increasing block tariff, already existing in many other countries and considered very effective in reducing illegal connections and more equitable.

Q.16 CAPEX Costs

Exact formulation of the Question: *What about CAPEX costs? How and when will this problem be solved?*

Q.16 - Current situation about CAPEX



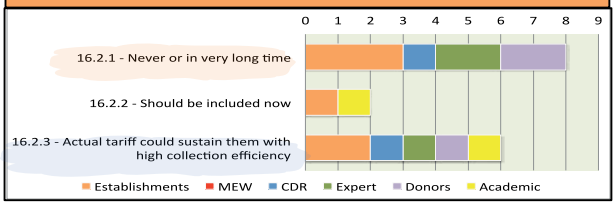
	16.1.1 - Now totally depending on foreign donations or loans	16.1.2 - Only BML has been able to invest	16.1.3 - No idea
Academic	1	0	0
Donors	3	1	2
Expert	3	1	1
CDR	2	0	0
MEW	2	0	0
Establishments	2	1	0

Current situation CAPEX costs

It is clear from the answers provides that Capital investments costs (CAPEX) are actually totally depending on foreign donations or loans and not from tariffs.

Just Beirut and Mount Lebanon Establishment (BML) has been able up to date to make capital investments with revenues from fees collection.

Expected period when CAPEX will start to be considered

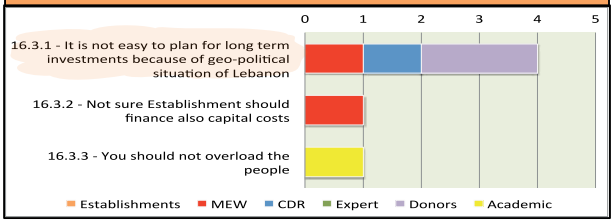


Expected period when CAPEX will be considered.

To the specific question when tariffs should start to include also recovery of capital costs, opinions are very different even inside same categories of respondents.

For the majority CAPEX costs will never be considered or just after a very long time from now. A consistent number of respondents think that actual tariff would be sufficient to cover also capital costs if there would be an increase in collection efficiency.

Doubts about insertion of CAPEX in tariff

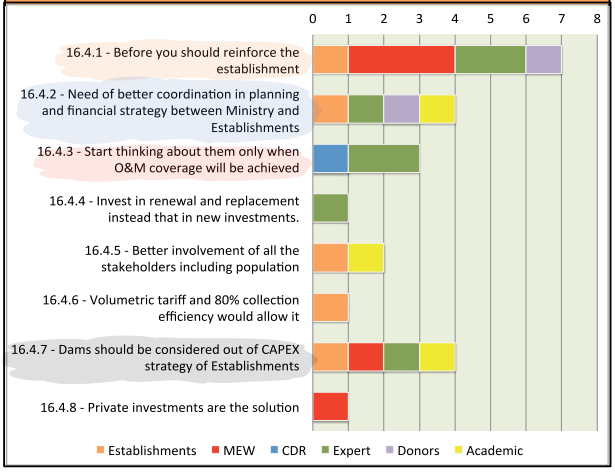


Doubts about insertion of CAPEX costs in tariff

Some interviewees raised the problem if capital costs should or should not been included at all in tariff even in future (interesting to notice that Establishments nor Experts are not within this group of respondents).

These opinions are mainly related to the particular geo-political situation of Lebanon that does not facilitate long-term investments.

Recommendations for covering CAPEX costs



Recommendations for covering CAPEX costs

Interviewees provided some recommendations in how to deal with CAPEX costs in future.

As primary step it is important to reinforce Establishments before introducing any concept of CAPEX recovery. This is a position particularly present at Ministry level.

A better coordination in planning and financial management is considered necessary between Ministry and Establishments in order to better deal with this problem.

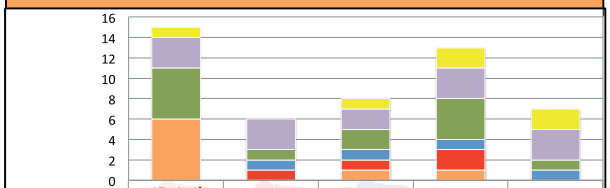
CAPEX should be considered only when OPEX costs are fully recovered.

Some respondents stressed that the strategy for construction of Dams should not be included.

Q.17 Correlation between Level of Service and Subscriptions/Payments

Exact formulation of the Question: *In the areas where the service has been recently improved, the subscription and payment rate have been increasing? How much? Is the tendency stable or does it decrease after some years?*

Q.17.a - Correlation between Service and Subscriptions



	17a.1 - If service improves subscription directly improves	17a.2 - I think it increases with the improvement of the service	17a.3 - I do not think is correlated or not consistent data to show it	17a.4 - it depends from many factors	17a.5 - I do not have information
Academic	1	0	1	2	2
Donors	3	3	2	3	3
Expert	5	1	2	4	1
CDR	0	1	1	1	1
MEW	0	1	1	2	0
Establishments	6	0	1	1	0

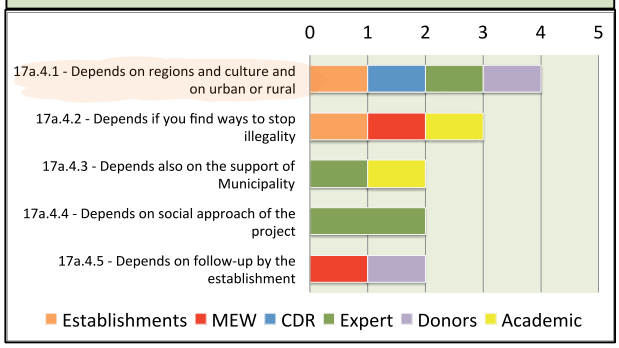
Correlation between Service and Subscriptions

Majority of respondents state that if service improves the rate of subscriptions consequently increases (most of the representatives from Establishments have this opinion), while some others consider this as a logical consequence but do not have a clear opinion about it.

A relevant number of actors consider that quality of service and subscriptions in Lebanon are not correlated between them or in any case there are not consistent data to show it.

Between this same group of respondents some think that rates of subscriptions are mainly related to natural demographics increases and not to the quality of service provided.

Factors influencing the relation service-subscriptions

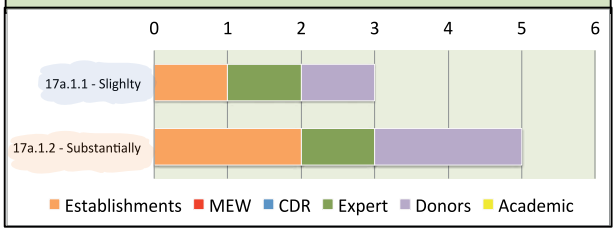


Factors influencing the relation service-subscriptions

Others are more skeptical and stress that there are also other important factors that should be taken in account like:

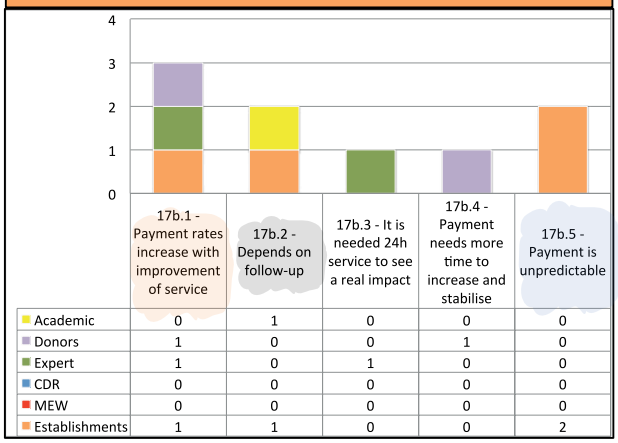
- Particular region of intervention;
- If the area is urban (better than rural);
- Support received from the Municipality;
- The social approach proposed during implementation of infrastructural improvements;
- The follow-up for subscriptions made by the Establishments;

If service improves subscriptions directly improves



Between those that think there is a direct correlation, the majority declares that this correlation is substantial, while others just consider it as very small.

Q.17.b - Correlation between Service and Payments



Correlation between Service and Payments

Similar question has been proposed putting in relation improvement of service and payments.

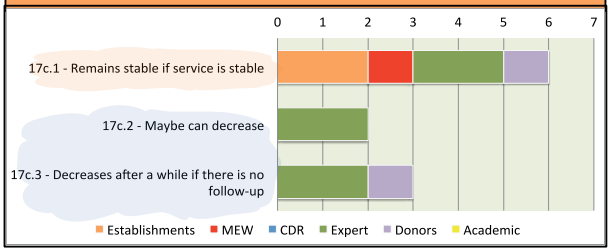
Less actors replied to this question as many actors considered it a repetition of the previous question.

It is opinion of the author that there could be different causes and relations between the two elements and for this reason it has been proposed.

A small majority confirms that correlation is existent while others reply that payments are more unpredictable than subscriptions.

It is stressed the importance of follow-up for payments, more than what is requested for just subscriptions.

Tendency of payments after improvement of the service



Tendency of payments after improvement of the service

For the majority, the tendency of payment remains stable if quality of the service remains stable.

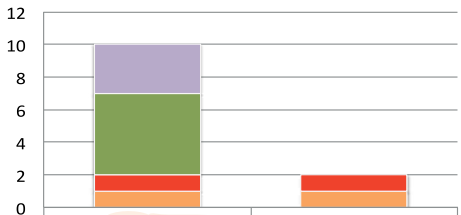
Others think that it can decrease with the time

Q.18 How to guarantee O&M if revenues are not sufficient?

Exact formulation of the Question: *Some reports states that if we expect people to pay for water, the service should increase at the same level in terms of quantity, quality and especially reliability.*

If Establishments do not have enough revenues for guaranteeing proper operation and maintenance all around their Regional Area, how can the level of service be guaranteed and how to assure that new subscribers could keep paying?

Q.18 - How to guarantee O&M if revenues are not sufficient?



	18.1 - No way or viciuos circle with actual situation	18.2 - Establishments have already resources to guarantee O&M
Academic	0	0
Donors	3	0
Expert	5	0
CDR	0	0
MEW	1	1
Establishments	1	1

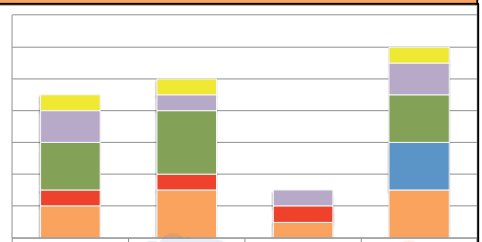
How to guarantee O&M if revenues are not sufficient?

Almost all actors provided recommendations in how to improve actual situation.

Many explicitly commented that **actual situation is a vicious circle that cannot be broken if there are no major changes in the approach.**

Just a couple of respondents stated instead that Establishments have already enough resources for Operation and Maintenance and that no major changes in strategy are needed.

Strategic recommendations for guaranteeing service



	18b.1 - Focus on citizens - Build trust	18b.2 - Improve management or strategy at Establishment level	18b.3 - Increase and strengthen staffs of the Establishments	18b.4 - Actions should come from the Government
Academic	1	1	0	1
Donors	2	1	1	2
Expert	3	4	0	3
CDR	0	0	0	3
MEW	1	1	1	0
Establishments	2	3	1	3

Strategic recommendations for guaranteeing service

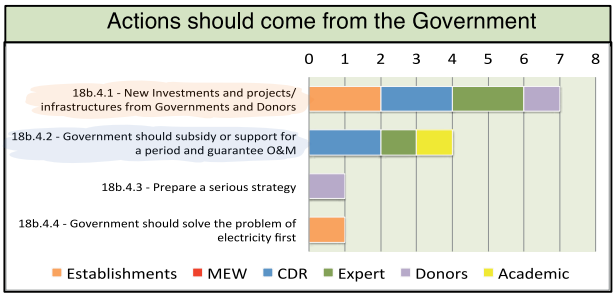
Based of the kind of recommendation, answers have been classified in four main categories.

a. The larger number of respondents sees government as the first stakeholder that should take the initiative.

b. Improvement at Establishments' level ranked just after.

c. Between these two categories some answers focused on a specific aspect between Establishments and MoEW that is the employment of additional qualified staff. Employment of staff cannot be considered as a complete responsibility of Establishments as their capacity to recruit staff is also depending on authorizations from Ministry.

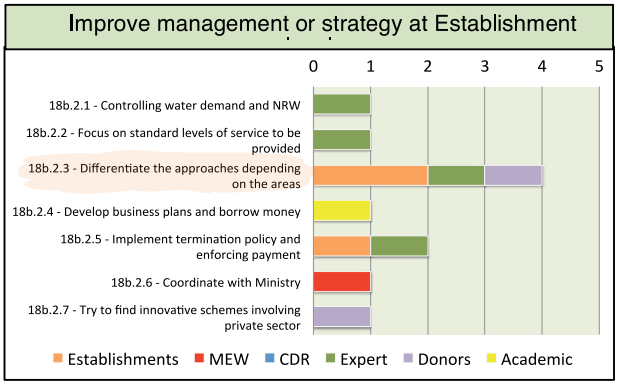
d. A relevant number of interviewees proposed instead to focus more on the relations with citizens and to build trust as the first step to change the strategy.



Recommendation: Actions should come from Government

The responses that are focusing on an intervention by the Government mentioned that:

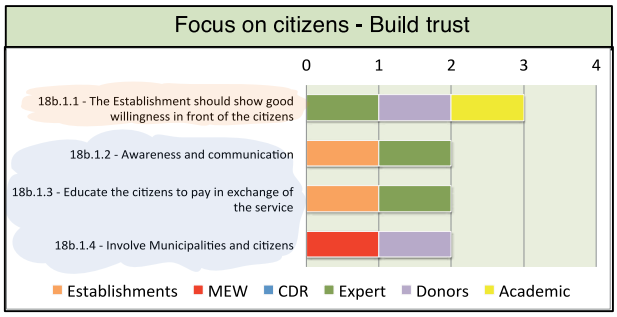
- New investments and projects should be brought from Governments or Donors;
- Government should subsidy or support O&M of infrastructures for a certain period after their construction.



Recommendation: Improve management or strategy at Establishment level

Those that focused on improvement of management at Establishment level, suggested to use different approaches in relation to different areas, especially in giving priority to villages with higher cost recovery and return for investment;

Others recommendations are very scattered and are indicated just in the graph.



Recommendation: Focus on citizens - Build trust

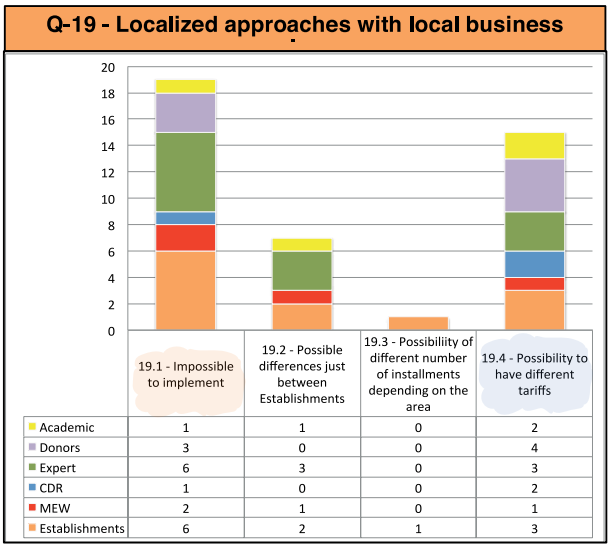
The initial step to build trust with citizens should be taken by Establishments.

They should show good willingness and make investments to go toward citizens. These investments would be repaid in the medium-long term.

Awareness and communication, education and involvement of citizens and Municipalities are seen as necessary steps to bring final users closer to institutions and let them be more responsible for payment and sustainability of the service.

Q.19 Localized approaches with local business plans are an option?

Exact formulation of the Question: *What do you think about charging local water fees calculated on the real direct cost of providing water at local level and guaranteeing proper transfer of indirect costs to the Establishment? Do you think this solution would be promoting more local cost recovery, as the service level would be directly affected by revenues collected locally?*

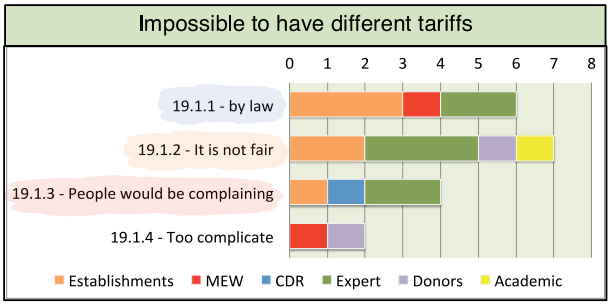


	19.1 - Impossible to implement	19.2 - Possible differences just between Establishments	19.3 - Possibility of different number of installments depending on the area	19.4 - Possibility to have different tariffs
Academic	1	1	0	2
Donors	3	0	0	4
Expert	6	3	0	3
CDR	1	0	0	2
MEW	2	1	0	1
Establishments	6	2	1	3

Localized approaches with local business plans

Considering actual difficulties for Establishments to maintain adequate levels of service everywhere because of scarcity of revenues and personnel, it has been asked if it was possible to have specific decentralized managerial solutions with different tariffs depending on local business plans and level of service provided.

Also around this question opinions are conflicting between those that see option as possible and those that are firmly convinced that this is impossible.

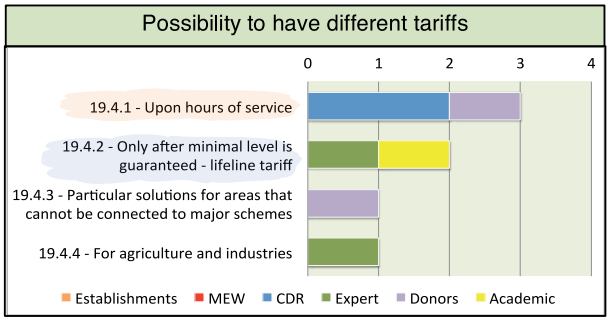


Impossible to have different tariffs within the same Establishment

The large majority stated that it is not possible to have different tariffs within the same Region or that this can be justified only between different Establishments.

The main reasons for this impossibility are:

- It would be not fair;
- The law does not allow it;
- The complaints of people would be too many;



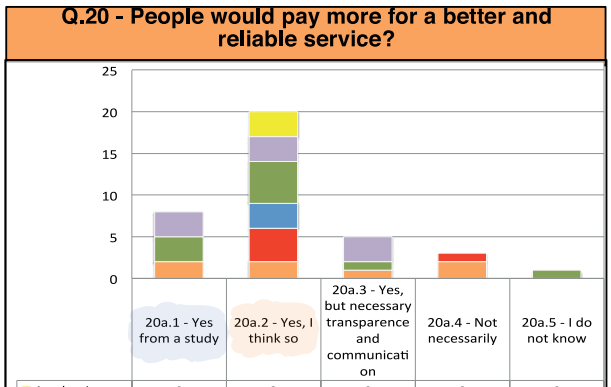
Possibility to have different tariffs

A still relevant number of actors (no one from Establishments or MoEW) consider possible to have different tariffs within the same Establishment. Between them some have been more specific and proposed possible criteria like:

- Hours of service provided: 24h can be paid more;
- The minimal quantity for survival (drink and hygiene) should have the same price; the volumetric tariff after this lifeline can have different values.

Q.20 Willingness to pay

Exact formulation of the Question: *Some studies mention that the HH spend on average three times more for informal water suppliers in relation to what they pay to the Establishment through their annual fee. Do you think that customers would pay more for a better and reliable service? Has any WTP survey been conducted in the area?*



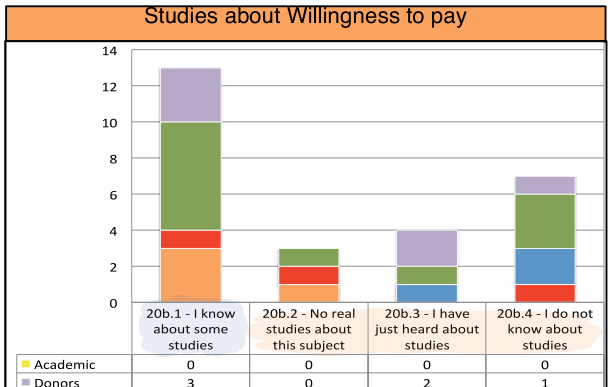
	20a.1 - Yes from a study	20a.2 - Yes, I think so	20a.3 - Yes, but necessary transparence and communication	20a.4 - Not necessarily	20a.5 - I do not know
Academic	0	3	0	0	0
Donors	3	3	3	0	0
Expert	3	5	1	0	1
CDR	0	3	0	0	0
MEW	0	4	0	1	0
Establishments	2	2	1	2	0

People would pay more for a better and reliable service?

The majority thinks that citizens, if provided with a better and more reliable service, would pay even more for public water in relation to actual tariff.

Some of the actors that declared this, based their opinion on studies they accessed to in the past, while others just on their personal experience.

A smaller group stressed that not just the service should be improved to receive higher payments, but also communication and transparency about management should improve in order to create trust between citizens and Establishments.



	20b.1 - I know about some studies	20b.2 - No real studies about this subject	20b.3 - I have just heard about studies	20b.4 - I do not know about studies
Academic	0	0	0	0
Donors	3	0	2	1
Expert	6	1	1	3
CDR	0	0	1	2
MEW	1	1	0	1
Establishments	3	1	0	0

Studies about Willingness to pay

It has then been requested to the interviewees if they were aware of any study about willingness to pay conducted in the country.

One third of the interviewees are aware of studies, but just few have been more specific (GIZ, WISE, LWWS, USAID)

An equivalent number of respondents does not know any study about the subject or just heard about studies without knowing the findings.

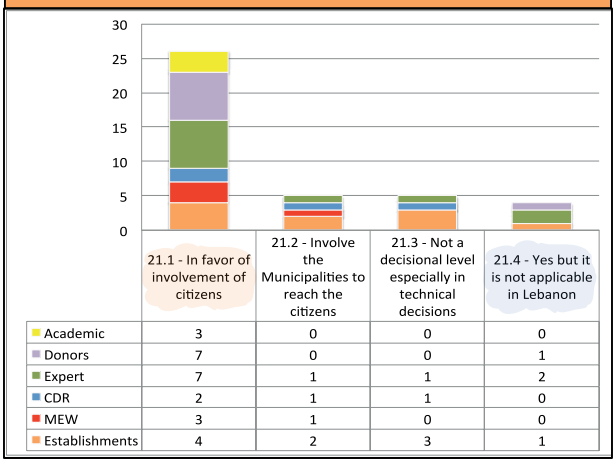
Few respondents stated that no real study about the subject has been conducted up to date.

2.2.4 Chapter 4 – Participation Of Citizens

Q.21 Participation of citizens in decisional processes

Exact formulation of the Question: *When we talk about customer participation in decision processes what is your point of view? Do you think they should be consulted about the level of service to be provided in order to align it with their willingness to pay?*

Participation of citizens in decisional processes



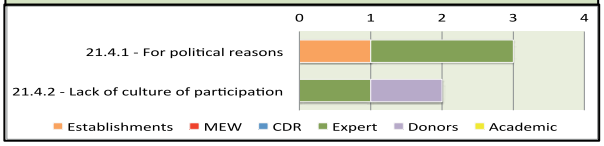
	21.1 - In favor of involvement of citizens	21.2 - Involve the Municipalities to reach the citizens	21.3 - Not a decisional level especially in technical decisions	21.4 - Yes but it is not applicable in Lebanon
Academic	3	0	0	0
Donors	7	0	0	1
Expert	7	1	1	2
CDR	2	1	1	0
MEW	3	1	0	0
Establishments	4	2	3	1

Participation of citizens in decisional processes

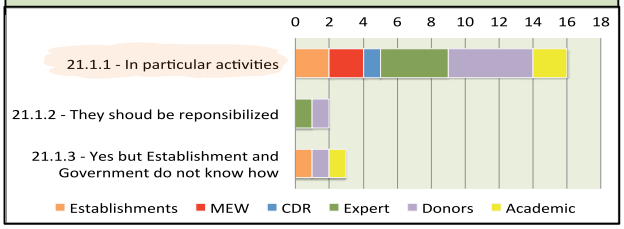
When requested about involvement of citizens in decisional processes the large majority is in favor even if under different forms.

Very few declared that participation would be a good thing but realistically not possible to implement in Lebanon, because of political reasons and lack of culture for participation in public decisions.

Participation is okay but it is not applicable in Lebanon



In favor of involvement of citizens



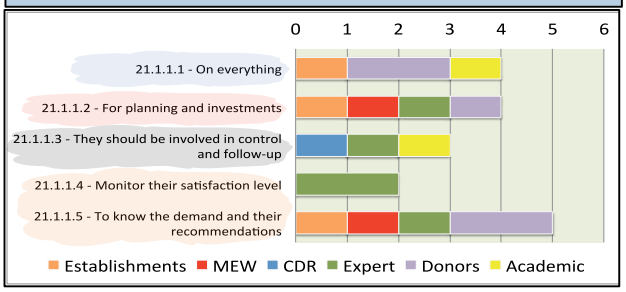
In favor of involvement of citizens

Between respondents in favor some stressed that Government and Establishments, in case they would like to, practically do not know how to implement it.

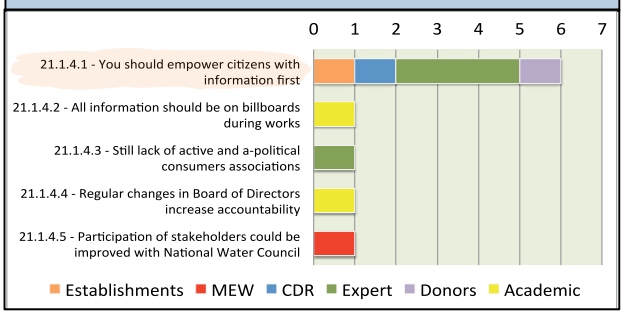
Some respondents simply replied that participation should be on every aspect of the public service; others have been more specific by detailing certain areas where participation should be promoted: General planning and investments;

- Control and follow-up of the management;
- Measure satisfaction level;
- To know better the demand that citizens have and listen more to their recommendations about the service.

Involvement in which particular activities?



Recommendations for involvement

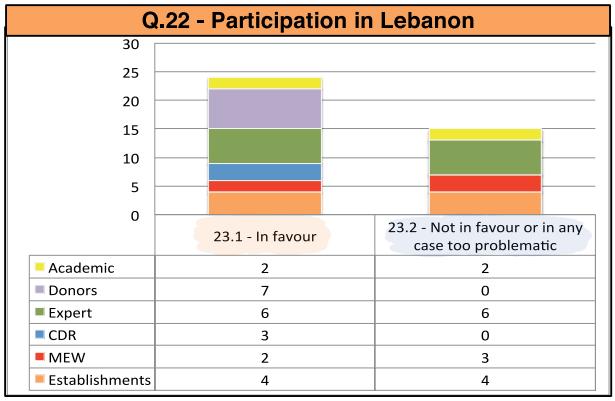


Recommendations for involvement of citizens

Between the specific recommendations provided by interviewees, the most frequent is to start by empowering citizens with information.

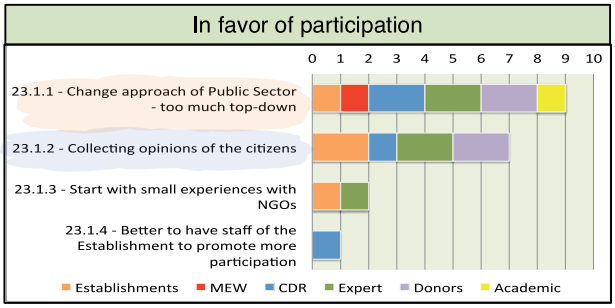
Q.22 Participation of citizens to Lebanese water sector

Exact formulation of the Question: *Internationally, participation of citizens in decision process for the water sector has been considered in the last years as a way to improve transparency and confidence into the managing structures with consequent increases of rate of payment and levels of service. What do you think about this statement in relation to Lebanon?*



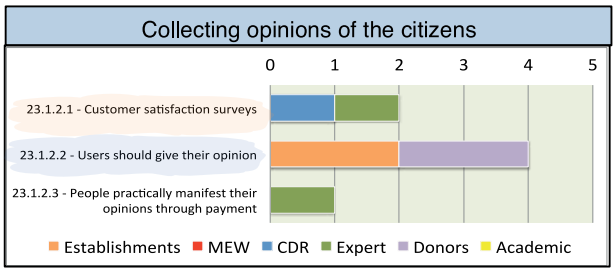
Participation in Lebanon

When requested specifically about participation in Lebanese water sector, the majority is in favor, but a relevant number of actors are against it. To note that donors are all in favor.

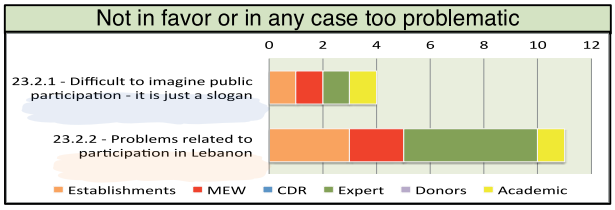


In favor of participation

Those in favor mainly mentioned the need for changing the traditional public approach (too much top-down), and that it is very important to collect opinion of the citizens.



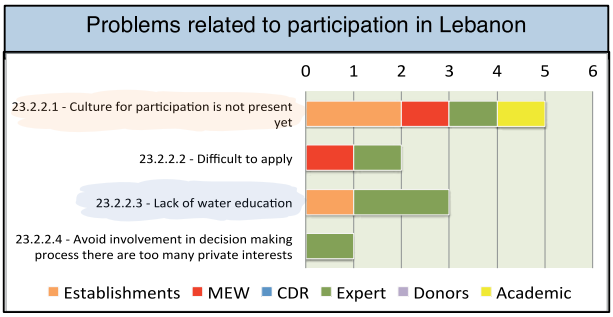
In order to collect opinion of citizens, some recommended customer satisfaction surveys or in any case to create the conditions for citizens/ customers to provide their evaluation about public services.



Against participation

Actors that are not in favor of participation stressed that this is related to the particular situation of Lebanon, where culture of participation does not exist at all and for this it is still difficult to apply.

Diffused lack of "water education" is mentioned also as one of the causes that impede participation to the sector.

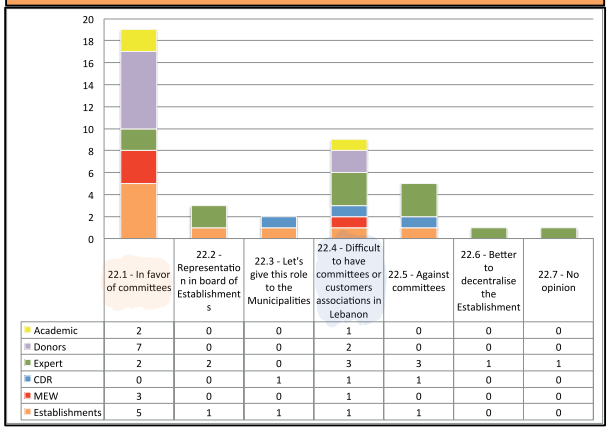


Some other against participation commented that "participation" in itself it is just a slogan brought in the country by International mainstreamed policies from foreign organizations.

Q.23 Customers' committees

Exact formulation of the Question: *What about creating committee of customers that could take part in monitoring the management of the service and contributing in defining level of service?*

Q.23 - Creation of customers' committees



	22.1 - In favor of committees	22.2 - Representation in board of Establishments	22.3 - Let's give this role to the Municipalities	22.4 - Difficult to have committees or customers associations in Lebanon	22.5 - Against committees	22.6 - Better to decentralise the Establishment	22.7 - No opinion
Academic	2	0	0	1	0	0	0
Donors	7	0	0	2	0	0	0
Expert	2	2	0	3	3	1	1
CDR	0	0	1	1	1	0	0
MEW	3	0	0	1	0	0	0
Establishments	5	1	1	1	1	0	0

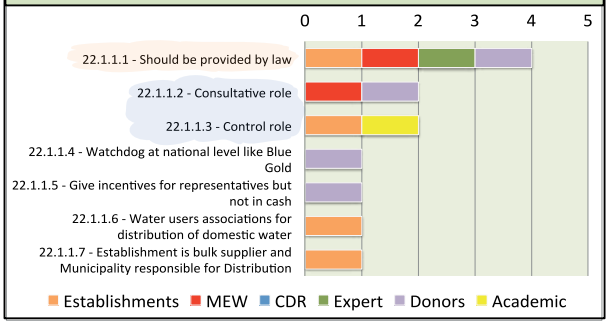
Creation of customers' committees

Majority declared to be in favor of committees, but many have different kind of opinions.

A certain number is completely against while others propose instead to give this role to Municipalities or to reinforce their representativeness within the board of Establishments.

A relevant number comments that it is too difficult to have committees or real customer associations in Lebanon; most of them are too politicized.

Recommendations for involving committees



Recommendations for involving committees

Those in favor of creating committees stressed that their role should be provide by law.

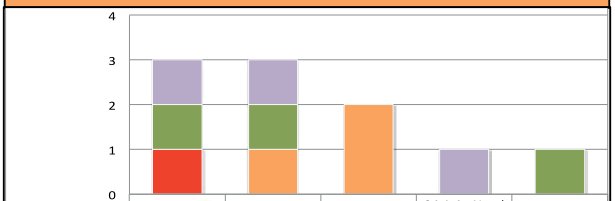
Their possible roles range between Consultation and Control.

2.2.5 Chapter 5 - Wastewater

Q.24 Wastewater tariff

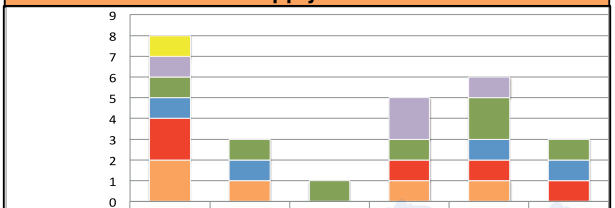
Exact formulation of the Question: *How do you think should be calculated the tariff for wastewater?*

Q.24.a - General comments about wastewater sector



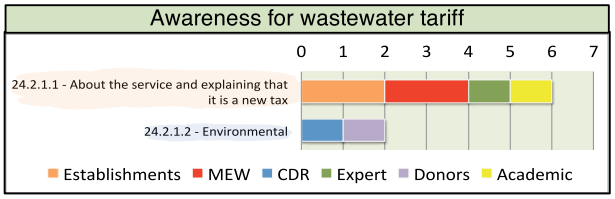
	24.1.1 - Establishments are actually avoiding to face the problem	24.1.2 - Define clear strategy and organise the sector seriously	24.1.3 - Ask privates to operate the facilities	24.1.4 - Need an economic assessment in how problem of wastewater is impacting in the economy	24.1.5 - Implementer of the project and manager should be the same entity
Academic	0	0	0	0	0
Donors	1	1	0	1	0
Expert	1	1	0	0	1
CDR	0	0	0	0	0
MEW	1	0	0	0	0
Establishments	0	1	2	0	0

Q.24.b - How to apply wastewater tariff ?

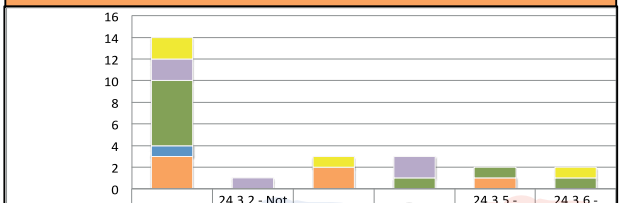


	24.2.1 - Doing awareness	24.2.2 - Enforcing law and cutting water	24.2.3 - Involve municipalities in collection	24.2.4 - Small amounts to get people used and then gradual increases	24.2.5 - Showing that there is a service	24.2.6 - Related to the service - connected or not to WWTP
Academic	1	0	0	0	0	0
Donors	1	0	0	2	1	0
Expert	1	1	1	1	2	1
CDR	1	1	0	0	1	1
MEW	2	0	0	1	1	1
Establishments	2	1	0	1	1	0

Awareness for wastewater tariff



Q.24.c - How to calculate wastewater tariff ?



	24.3.1 - Proportional to water consumed	24.3.2 - Not consensus between flat or volumetric	24.3.3 - Fixed amount	24.3.4 - Should know the cost first	24.3.5 - Industries should have different rates	24.3.6 - Introduce tariffs for re-use for farmers
Academic	2	0	1	0	0	1
Donors	2	1	0	2	0	0
Expert	6	0	0	1	1	1
CDR	1	0	0	0	0	0
MEW	0	0	0	0	0	0
Establishments	3	0	2	0	1	0

a) General comments about wastewater sector

When asked to comment wastewater sector comments received are various.

Most of them are focusing in the lack of a clear strategy not only in relation to tariffs but also to the whole management of the sector.

Some interviewees from Establishments propose to rely directly on private operators for operation of the facilities (it is not clear from the answers how these private operators should be paid).

b) How to apply a wastewater tariff?

Tariff should be introduced first by creating awareness about service provided and in particular by explaining to citizens that wastewater tariff is a new fee for a new service that did not exist before.

Just few recommended focusing on environmental awareness for promoting wastewater tariff.

Others recommended ways to apply the tariff are in the order:

- To show that a service is really existing;
- To insert a fee with gradual steps in order to get people used to it (actual strategy proposed by the MoEW). This fee should be higher in case the sewage network is connected to a functional Waste Water Treatment Plant;
- Apply the law and for those that do not pay to cut also water services;

c) How to calculate a wastewater tariff?

When requested how the tariff should be calculated, the large majority said that it should be proportional to the water consumed *(considering the actual problem with installing and reading water meters this stage seems still far).*

For some actors the tariff should be flat and other are not sure if is preferable flat or volumetric.

Some actors stressed that industries should have different tariffs and others suggested a special tariff for farmers that are reusing treated water.

Interesting the comment of three actors, stressing that before setting up a tariff it should be calculated first what is the real cost for the Establishments to manage wastewater services.

2.3 FINDINGS FROM MAIN ACTORS SURVEY

From the answers provided by the actors it is possible to draft some conclusions about the initial questions raised for the research (see above: part 1.4.3.2):

2.1. What are actual problems and constraints in relation to cost-recovery in water sector in Lebanon?

- When requested what are the problems with the actual (existing or not) strategy for cost recovery the replies are various and identify different possible causes that are focusing on Establishments, national situation or directly on citizens. **The general impression from interviews of the main actors regarding cost recovery strategy is that of a scenario of diffused, variegated and often contradictory opinions with a wide range of responsibilities addressed to the principal stakeholders of the sector.**
- The majority of the responses focused on problems related to management done by the Establishments especially in terms of poor culture of production control and knowledge of real cost of water and because of absence of water demand management.
- Lack of qualified staff at Establishment level and incapacity to set the tariffs are mentioned by other respondents that stressed also the too high dependency of Establishments from external funds (with little involvement in the management of these funds).
- Others focused their response on a wider national situation, stressing few factors like a generalized lack of trust in public institutions, political interferences and the Syrian crisis.
- Others identified the citizens as the main responsible for low cost recovery in Lebanon, stressing especially low payment rate and illegal connections.
- Many actors consider the actual situation in Lebanese Water sector as a "vicious circle" that cannot be broken unless there are no major changes in the approach.

2.2. What are the actual strategies in place for cost-recovery?

- Almost half of the actors interviewed think that there is not a real strategy in place for cost recovery in Lebanese water sector.
- Those that think that a strategy exists, have been mainly mentioning the fact that Establishments have business plans or master plans.

2.3. What is the level of application of water demand management measures in Lebanon?

- Large majority of respondents confirms that water meters at production level are missing in most of the regions (the average estimations are at 50% around the country with a peak in the South at 90%).
- The actual strategy for installation of water meters is not clear to many actors that even doubt the real existence of a strategy. Up to date the installation has been done mainly within infrastructural projects framework and a real volumetric tariff has never been applied.
- Even when it is declared that a form of volumetric tariff is applied on top of the flat tariff (consumptions above 1m3 per day), in most of the cases Establishments are not making real follow-up as they lack personnel and capacity to read and maintain the meters.

- Practically all the interviewees support the installation of water meters and consider that it would bring important effects in terms of:
  - Water management (important for reducing illegal connection and to charge the real consumption). Many stressed in any case that domestic meters are just one between many elements needed for improving the management of the sector;
  - Water conservation (water metering is considered as the best awareness tool for this purpose)
  - Equity of the service
- Awareness about water conservation has been promoted through some campaigns that have been generally considered as useful. Even if outcomes are considered positive, the real impact is not known or in any case is considered quite limited.
- Many respondents consider lack of bulk meters as one of the main problems for water resource management: the introduction of a volumetric tariff, whatever the way it will be calculated, it is considered a crucial step in the right direction for the whole sector.

2.4. Are there best experiences or capitalized pilot projects to refer to in the sector?

- When requested to describe best experiences, the majority of the interviewed were able to mention, or had heard about, a specific experience. The most cited are BML Establishment (that is presenting good cash flow) or GIZ that in South tried to install water meters (even if this experience has been considered as a failures by others because interrupted for local political interests).
- In Lebanon there are not successful experiences in cost recovery that could be used as example for replication by Establishments or by other actors.
- The experiences conducted and their lessons learned have not been properly capitalized and/or shared with all the actors (if this has been done the impact of this shared knowledge is not appreciable in most of the actors interviewed) in order to draft a possible follow-up or to give recommendations for further development.

2.5. What are the different opinions about the actual tariff in relation to coverage of OPEX and CAPEX costs?

- Lack of bulk meters at production level, but also proper reading and analysis of data is a major deficiency in the managerial system of all the Establishments that do not have proper data to calculate the real cost of m3.
- Estimations and approximations in the calculation of the quantities produced have as a consequence approximations in the data entered in business plans and incapacity to properly monitor the Non Revenue Water (NRW) and proper calculation of the tariff.
- Opinions about possibility to cover OPEX costs with the actual strategy are conflicting. Half of the actors think that Establishments will never be able to achieve it, or just after a very long time while similar number of respondents is expecting to cover them within the next five years.
- Opinions about the actual flat tariff applied in Lebanon are also conflicting because for almost half of the respondents (including actors from Establishments) the tariff, whatever the percentage of payers, will never be sufficient to cover OPEX costs. Also here, half of the respondents have different opinion and declare that it would be sufficient with collection efficiency higher of 80-90%.
- It is common opinion that CAPEX costs, actually completely depending from foreign donations or loans, will never be covered, nor even considered, with actual strategy. A relevant number of main actors thinks

instead that actual tariff with high collection efficiency could cover also capital investments.

- The possibility to have different tariffs, in relation to a local business plan or upon level of service provided, is considered by a majority as not fair or legal and not possible to be implemented within the same Establishment. Different tariffs could be accepted just between Establishments. Whereas, a still relevant number of people think instead that localized approach are feasible and propose that tariff could be regulated at least upon hours of service provided (as example 24h service could have an higher tariff).

2.6. Would people pay more for a better and reliable service?

- The problem of tariff is exacerbated by low rates of subscriptions and low rate of payments that are common to most of the Establishments (at least Bekaa, North and South) and are mainly due to low quality of service provided, lack of trust in public sector, incapacity to enforce the law and large diffusion of illegal connections. Both Water Establishments, National Government and citizens have responsibility for this situation according to the main actors.
- Even if considered as a logical consequence, a relevant number of actors still think that in Lebanon the correlation between improvement of the service and increase of subscriptions is not evident (to be stressed that most of the actors from Establishments confirm instead the existence of this correlation).
- There are also other factors considered relevant for subscriptions, like:
  - Particular region or area of intervention (urban is considered better);
  - Support received from the Municipality in supporting collection;
  - Social approach promoted during the implementation of the infrastructural activities;
  - The follow-up made by the Establishments.
- The problem of low payments can be considered similar to the one of low subscriptions, but in this case Establishments have a larger responsibility because they do not make adequate follow-up for collecting payments.
- The correlation between level of service and payments is considered much more unpredictable than the one with subscriptions and in any case depending more also on additional factors like Establishments follow-up.
- Strategies of incentives for promoting subscriptions and payments have been already tried, but with limited results, by all the Establishments. The best tools to achieve these results are considered by many the simple improvement of service and launch of awareness campaigns.
- At this stage, in relation to water cost recovery (payment for water) very little has been done in terms of awareness and also the impact is considered limited.
- There have not been major studies to assess citizens/customers' willingness to pay or, if they have been conducted, the results have not been properly communicated.
- It is diffused opinion that citizens, in exchange of a better and reliable service, would pay even more than the actual tariff.
- "Reliability of the service" is achieved with technical improvement of infrastructures and better operation and maintenance of the service but also with proper customer services and communication in order to gain "a reliable trust" of the citizens (toward the Water Establishments among others).

2.7. Do Municipalities still play a role, or should they have a role, in the sector? And what are their relations with Establishments?

- The expression, "lack of trust", can be used to describe relations between Establishments and Municipalities. It should be stressed that the relation can in certain cases be also good but this is depending on several factors like quality of service provided, religious and/or political affiliations, rate of subscriptions and payments within the Municipality.
- Even if Municipalities by law do not have any more a formal role in water sector (since law 221), most of the actors declare that in reality Municipalities still play a role like maintenance and extension of existing networks or by implementing projects in direct contact with donors.

2.8. What is the level of participation of citizens as stakeholder in the sector and what are their relations with Establishments?

- Relations between Establishments and citizens also can be described with a general "lack of trust". Some citizens do not even know the role of Establishments. Dialogue is absent or it is just limited to payments issues.
- Participation of citizens is seen as a positive thing, even if many actors consider difficult to be implemented in a country like Lebanon characterized by top-down policies and complete lack of culture for participation. This culture is lacking from Governmental or Establishment side but also from citizens side.
- Customer Services in the Water sector are considered of very low quality, or practically non-existent. The same as in the whole public sector in Lebanon, where the culture for pro-active customer services is completely absent.

2.9. What are the expected reactions from Citizens in relation to application of water demand management measures indicated in National Water Strategy?

- The expected level of citizens' acceptation for the installation of water meters and application of volumetric tariff is uncertain.
- Half of the actors think that acceptation of the volumetric tariff will be very bad while the other half is much more optimistic. Political interferences in the process should be taken in account.

2.10. What is the strategy for the application of the wastewater tariff?

- Most of the responses are stressing that the whole wastewater sector is lacking a clear strategy. It is not just a problem of application of a tariff.

2.4 RECOMMENDATIONS PROVIDED BY MAIN ACTORS

- Government and Establishments are considered the main stakeholders that should take the first step to break this vicious circle by elaborating an effective strategy.
- From the Government are expected new infrastructural investments and support in O&M.
- Establishments are generally requested to improve their management and invest in communication with customers (citizens and municipalities) in order to improve awareness and bring them more close to public institutions.
- In order to set-up a strategy for improvement of cost recovery at Establishment level, different recommendations with different focuses have been proposed. The most recurrent, apart a general improvement of services, are:
  - o Management at Establishment level:
    - Reduction of Non Revenue Water (NRW)
    - Metering demand and application of volumetric tariff;
    - Improved knowledge of production and costs and better application of a business plan approach;
  - o Customers:
    - Create awareness for payment
    - Renew customer databases to identify illegal connections
  - o National government
    - Support enforcement of law
    - Independency of the sector from external political interferences
- Installation of domestic water meters is considered as an important step to improve management and reduction of illegal connections, but at the same time also to promote water conservation and equity in the service.
- The recommended advices for installing domestic meters are:
  - o Provide 24h service before applying the volumetric tariff;
  - o Create awareness before installation;
  - o Apply volumetric tariff at the same time of installation;
  - o Target areas estimated to be more receptive (urban areas in particular).
- The introduction of a volumetric tariff, whatever the way it will be calculated, it is considered a crucial step in the right direction for the whole sector.
- Whenever it will be decided to introduce capital cost recovery tariff, it is recommended that a better coordination between Ministry and Establishments be achieved around investments.
- The large majority of actors are in favor of giving a role to Municipalities, like
  - o Representation of citizens in front of Establishments;
  - o Promotion of payments to Establishments and support in enforcing law against illegal connections;
  - o Contribution in creating awareness for citizens.
- The majority of actors are in favor of more involvement of Union of Municipalities within water and wastewater sector. Those that are in favor suggested that Union could be involved for planning of multi-municipal projects (especially for wastewater) and they could be the basis follow-up for subscriptions and payments at household level.
- In order to improve relations with citizens it is important to start considering them as a real stakeholder in the sector.
- The most mentioned recommendation in how to involve citizens/customers is to start by empowering them with information about the sector.

- Citizens should be brought more close to public institutions especially with roles of control and follow-up. Better knowledge of their opinion and their demand are considered as the starting point for their involvement.
- Improvement of customer services is crucial for improving relations with citizens. The Establishments should follow the example of private sector, professionalism and pro-active attitude. It is necessary to facilitate modalities of payment but also to invest in better informatics systems for follow-up of customers' claims.
- Establishments should make use of specialized people to launch communication campaigns with citizens. The information should be provided primarily with the objective to empower citizens.
- Recommendations for awareness campaigns related to payments of water are:
  - o Design campaigns after having listened to citizens real concerns;
  - o Let citizens visualize economic advantages achievable by using public water services instead than alternative sources (bottled water, water trucking, private wells);
  - o Communicate achievements of the Establishments but also the problems Establishments are facing every day in order to increase transparency in the management.
- Awareness campaigns for water conservation should be conducted at national level and should be a continuous activity.
- The main target for water conservation campaigns should be schools. The topic should be inserted directly in the curricula.
- There have not been major studies to assess citizens/customers' willingness to pay or, if they have been conducted, the results have not been properly communicated. Communication and popularization of the results of these kinds of studies are considered very important for the future.
- In relation to wastewater:
  - o For the calculation of the tariff: the majority recommends that the tariff should be proportional to the consumption of water.
  - o For the application of the tariff
    - The best way to apply a wastewater tariff would be trough creation of awareness about the service in general, by explaining that this is a new necessary fee, the way it is calculated but especially by showing that a service is in place.
    - To notice that very few recommended doing awareness upon environmental factors.
    - Few recommended starting with small amounts to get people used to it and then to increase it gradually.

2.5 WORD-CLOUD ANALYSIS FOR MAIN ACTORS SURVEY

A “word cloud” analysis has been generated using all the transcribed text of the answers given by respondents.

Word clouds are a method for visually presenting text data. The more frequent the work is used, the larger and bolder it is displayed.

This methodology does not have any pretention to be scientific but it has the advantage to help in visualizing in just one image the most important patterns related to the topic.

Here below the results. The author thinks that there is no need to provide additional comments to this image.

Newsletters published for communication with citizens

Household survey

PART III

CITIZENS / CUSTOMERS' SURVEY

3.1 RELATIONS WITH OTHER PARTS OF THE RESEARCH

The main objective for this part of the research is

- To assess directly from Citizens actual water coping strategies in rural areas of Lebanon (North Bekaa) and willingness to pay in order to develop water programs in line with strategic objectives of National Water Strategy especially in relation to water demand management.

The specific objectives can be resumed as follow:

- Assess citizens opinions and recommendations for the implementation of strategies indicated in National Water Strategy;
- Raise awareness of the citizens about some key points mentioned in National Water Strategy in relation to water demand management and cost recovery;
- Assess the benefits of making use of participative methodologies for implementation of water projects in Lebanon;
- Define a tool for promoting participation of citizens that could be replicated during implementation in other projects in Lebanon and feed a national database.
- Definition of research questions
- The main questions for this part of the research have been identified starting from the Literature Review presented in part 1 of the research.
- The methodology for definition of research questions has been properly illustrated in chapter 1.4.3.3.
- Please note that the numbering follows the sequence of the general research. This survey is considered as the third step of the research (as the second survey).
- Please find here below an extraction of the process to specify the links between literature review and main questions of this part of the research.

Main Findings from Literature review PART 1	Correspondent research questions in Citizens/Customers' Survey PART 3
• 1.1 - Public service is considered as insufficient and of poor quality all around the country. Lack of trust between final users and Water Authorities is mentioned in many documents. *This is the "main point" that should be answered in the sector and has been guiding the preparation of the whole research.*	• 3.1 - What are current citizens/customers coping strategies for obtaining water in the study area? • 3.3 - What are the expectations from a public water service in the study area? • 3.4 - What is the perceived quality of water from public network?
• 1.2 - Water tariff is considered by many as insufficient, what would be the real willingness to pay for the final users for a reliable service?	• 3.1 - What are current citizens/customers coping strategies for obtaining water in the study area? • 3.2 - How much do the population actually spend for water services (formal and informal providers)? • 3.5 - What is the citizens/customers' willingness to pay for a reliable public service for domestic water?
• 1.3 - Are water meters really feared by final users?	• 3.6 - To what extent are citizens/customers willing to accept water meters installation and a volumetric based fee?
• 1.4 - There is almost no experience about demand responsive approaches and at the same time citizens are not used at all to play any role in the public water sector. Does a specific participative approach, by helping people in understanding better their consumption patterns and actual costs, could help in promoting citizens/customers' participation to the sector and facilitate the implementation of National Water Strategy?	• 3.7 - Does a participatory approach using citizens/customers' surveys facilitate the implementation of effective water demand management programs?
• 1.6 - The actual implementation of cost-recovery strategy is delayed for: - Incapacity of the Establishment to make proper follow-up? - Political interferences? - Fear of citizens' response?	• 3.6 - To what extent are citizens/customers willing to accept water meters installation and a volumetric based fee?

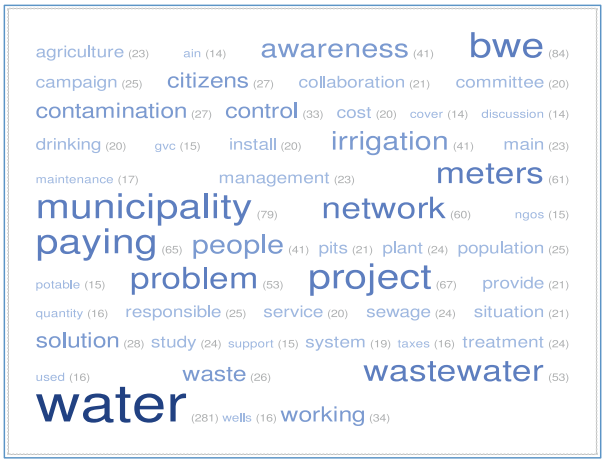
3.2 SURVEY PREPARATION AND METHODOLOGY

3.2.1 Survey preparation

A particular methodology has been followed for defining the modalities of implementation of the survey and for the definition of the questions.

Before realizing the survey on the field, a focus group has been conducted within each of the 5 target Municipalities involving Members of the Council and, wherever present, local associations.

Participants have been encouraged through participative group activities to express their opinion about actual services their Municipalities and to propose suggestions and solutions about improvement and sustainability of these services.



Word Cloud Analysis Municipal workshops

Minutes of the meetings and a "word cloud" analysis (simple count of the frequency of words used during focus groups discussions) have shown that most of the issues mentioned in National Water Strategy, and considered as essential to address the problem of Public services and promote conservation of water resources, are already known by many of the Municipal actors.

From the analysis launched and represented in the following table, some considerations can be done:

- **"WATER" (281) vs "WASTEWATER" (53)**. This compared frequency shows how the problem of water is perceived as much more important in relation to the one of wastewater.
- **"MUNICIPALITY" (79) vs "BWE" (84)**. The frequency of the word Municipality in relation to the BWE (Bekaa Water Establishment) shows that people still assign an important role to the Municipality in relation to the Establishment (by law the only institution responsible for water supply).
- **"PAYING" (65)** show that lack of proper payment by the people to the Establishment is perceived also by people at Municipal level as one of the main problem that should be overcome before reaching sustainable services;
- **"METERS" (61)** is showing that introduction of water meters is one of the main solutions proposed by the participants in order to improve water service. This aspect is particularly interesting because the perceived level of acceptation of people in relation to water meters is rated as very low by the Establishments;
- **"AWARENESS" (41)** has also been repeated with an important frequency during the discussions, and indicated as a key to change the actual behavior of people especially for water demand management and water resources conservation.

This simple word frequency analysis that does not have, and did not pretend to have, any scientifically basis has been used as communicative tool to show the main areas where concentrate more the following investigations.

The important for the research will be to understand to a what degree the knowledge among people from rural areas is in line with National Strategy and where awareness activities would be needed to address possible gaps in knowledge.

The focus groups have also been important to introduce the idea of the survey to the Municipalities and to facilitate the access to the households for the surveyors.

It has been promoted the participation of a surveyor from each municipality to the survey by asking each Municipality to provide at least 3 CV of literate people (with knowledge of English) from the area. The participation of a surveyor from each Municipality has been considered as a way to increase transparency in the surveying process by allowing the Municipalities to be able to request direct feedbacks to their own representatives.

A total of 5 surveyors, one from each Municipality, have been accompanied by 3 experienced surveyors directly recruited by GVC, for a total of 8 field surveyors, under the supervision of GVC social activities coordinator.

3.2.2 Formulation of survey questions

In order to assure reliability of the data, the surveyors have been trained in surveying techniques (especially on critical triangulation of the answers and in techniques for not inducing answers to the interviewees) and the questionnaire has been developed using their knowledge about uses and practices in the area.

Attention to details, especially for triangulation purposes, promoted by the surveyors themselves, has been considered as a resource for the survey and for this reason many additional details have been added to an initial draft and as a consequence the final survey included more than 200 questions.

ODK software on tablets has been used for data collection in order to reduce time of data entry and possible mistakes. The only exception was constituted by the chapter related to weekly consumptions and costs table (Chapter 7 of the survey), for which it has been decided to do not collect data on the tablet, but instead to make use of pencil and paper and to let the interviewees fill and be able to visualize their own answers in order to facilitate their mental calculations during the process.

The survey has been initially formulated in English, then translated in Arabic by a professional translator, part of GVC team, and then conducted in Arabic.

The English and Arabic version are attached to this report in Annex 1.

The data collected has then been translated again in English and analyzed by the author.

The survey has been divided in 13 chapters named from 00 to 12.

Particular importance has been given to sequence of the chapters in order to promote auto elaboration of certain concepts in the respondents and to not induce answers from words used in previous questions.

As simplified example of this process, the question: *"what would you propose in order to align consumption with tariff?"* has been placed before the direct question: *"what do you think about water meters?"*.

Allow the people to go through all the questionnaire step by step has been considered as a form of creating awareness and acquire personal knowledge and critical skills about different aspects of water services.

Let people think about their monthly consumptions and the way their electricity bill is calculated, has certainly influenced many respondents in developing a different opinion about water meters.

A straight question at the beginning of the process, like *"what do you think about water meters?"* would have probably just scared most of the respondents as it is a concept not really known or previously mentally elaborated by everyone.

With the same objective, almost all the questions have been proposed as "open questions" and not as closed (with pre-communicated possible answers).

Just on a secondary step the answers have been classified among main categories in order to facilitate the analysis of the results.

Some of these categories are very close one to each other. It has been a specific decision of GVC to show each different category instead of collapsing in just few single values when this could have brought some,

even minimal, loss of information.

As example, when it has been requested to classify the quality of water people do receive from the network (or from truck or well), people have been using these main four values: acceptable; bad; good; safe.

The values “good” and “safe” could be considered as synonyms in many other contexts, but in relation to water it has been preferred to leave them as separate because of possible different perceptions in relation to “potability”.

Some questions have also been repeated under different forms in different chapters in order to have the way to double check and triangulate some of the answers and exclude possible bias in interpretation.

For sure there could have been exaggeration in the estimations provided by some of the interviewees, but as already mentioned, is the process of **self-learning through reflection** that has been considered as priority.

It is worth to mention already at this introductory stage that the analysis of the outcomes shows results especially in relation to:

- average consumption per capita per day
- monthly household expense for water

that are completely in line with previous studies conducted in Lebanon by major institutions or research centers like WORLD BANK (2010) or ICEA-CORAIL (2004) and is also confirming data taken as assumptions by National Water Strategy (2012).

This final observation confirms the fact that the survey has an important validity not only as a tool to create awareness and stimulate participation among the beneficiaries, but also as a reliable source of detailed information about uses and practices of people in rural areas of Lebanon.

3.2.3 Definition of the sample

The objective of the survey has been mainly to let the surveyed be part of a process, get more conscious of their water use habits and actual costs they are incurring and to promote their interest in the project.

For this reason the survey has concentrated its effort mainly in the Municipalities of Zabboud, Bejjeje and Ain where the project is foreseeing an infrastructural intervention that will directly improve the public service.

Please refer the following table to see the foreseen impact of GVC project in the different Municipalities and the existing infrastructures. All five Municpalities depends on Bekaa Water Establishments for their water management.

Water Infrastructures current situation				GVC PROJECT	
	water scheme 1st construction	renewal or rehabilitation	notes	Project proposal	impact of Project
a_Bejjeje	1970	2011	renewed to be connected to Labwe. Labwe Municipality did not allow the connection. Some households are connected to Ain	borehole and cistern	HIGH
b_Zabboud	1974	1990	less than half of the municipality has a network. It should have been supplied from Harbata. The connection has never been allowed by Halbata Municipality	borehole and network	HIGH
c_Ain	1970	2008	almost all the municipality is covered	rehabilitation of a cistern	LOW
d_Nabi Osmane	1970	2004	almost all the municipality is covered	nothing	NO
e_Labwe	1970	2010	almost all the municipality is covered	nothing	NO

Water infrastructures per Municipality

	CAS 2010				BWE	GVC							sample %			4,57
municipality	population	buildings	units	commercial	Subscribers at BWE	surveyed households	households not reached	TOT existing HH (declared by Majors)	commercial	public	TOT SURVEYS	tot members from survey	% by population relation to CAS	% by buildings	% by population GVC extimate	expected population
a_Bejjeje	990	137	171	1	0	140	15	155	4	3	147	506	51%	82%	71%	708
b_Zabboud	1153	217	224	14	139	180	26	206	8	3	191	809	70%	80%	86%	941
c_Ain	8431	1271	1845	283	1091	375	na	na	22	7	404	1.6[illegible]	20%	20%		
d_Nabi Osmane	3281	581	765	78	146	60	na	na	0	0	60	256	8%	8%		
e_Labwe	6277	1670	2305	194	687	170	na	na	28	6	204	794	13%	7%		
TOT	20.132	3.876	5.310	570	2.0[illegible]	925			62	19	1.006	4.052				

Sample per Municipality

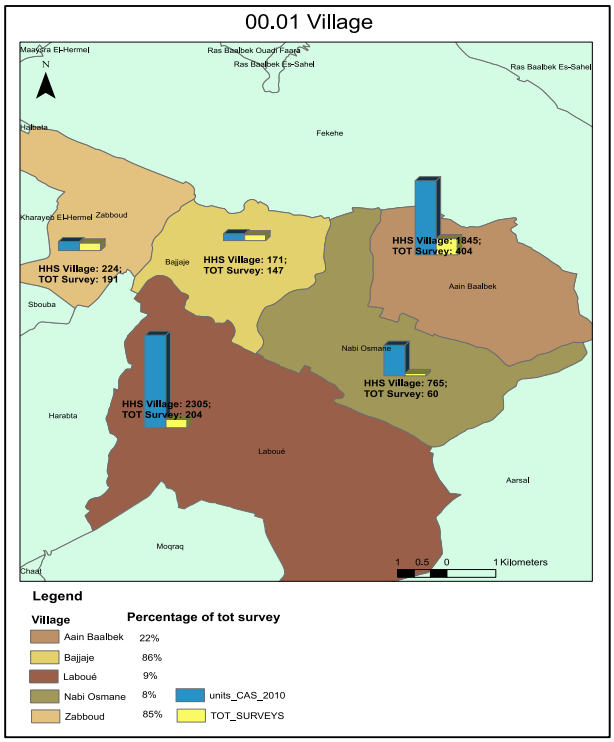
In the Municipalities of Zabboud and Bejjeje the objective of the survey was to reach the maximum number of households. This obviously has not been possible as some of the inhabitants are not present all along the year in the area and also because few people have not accepted to be interviewed.

Comparing the data with Mayors of Municipalities it can be estimated that 71% of the households have been reached in Bejjeje and 86% in Zabboud.

If the number of surveys is compared with National Statistics data (considered inaccurate also by the majors) the percentages get respectively to 51% and 70%.

A comparison done using the number of buildings (units in particular) from National Statistic data shows that respectively 82 and 80% of the units have been surveyed in these two Municipalities.

In the Municipality of Ain, much bigger than the previous two, the objective to be achieved has been set in 20% of the CAS data in order to achieve a statistically significant sample and at the same time to spread awareness though the process to a relevant number of households.



Map of surveys

This 20% target has been achieved considering either the number of people reached either the number of units that have been interviewed.

In the Municipalities of Labwe and Nabi Osmane (where no infrastructural interventions are foreseen within the actual project) it has been targeted around 7% of the units in order to have a statistically relevant number and at the same time with the objective to complete a total number of approximately 1.000 surveys for the whole area.

The percentages selected for the survey have been considered **functional to the objectives of the project.**

If considered in statistical terms they could bring to an **over-representation** of some villages with their specific problems in relation to the whole area.

Under a statistical point of view the Municipalities of Bejjeje and Zabboud and Ain are over-represented in relation to those of Labwe and Nabi Osmane.

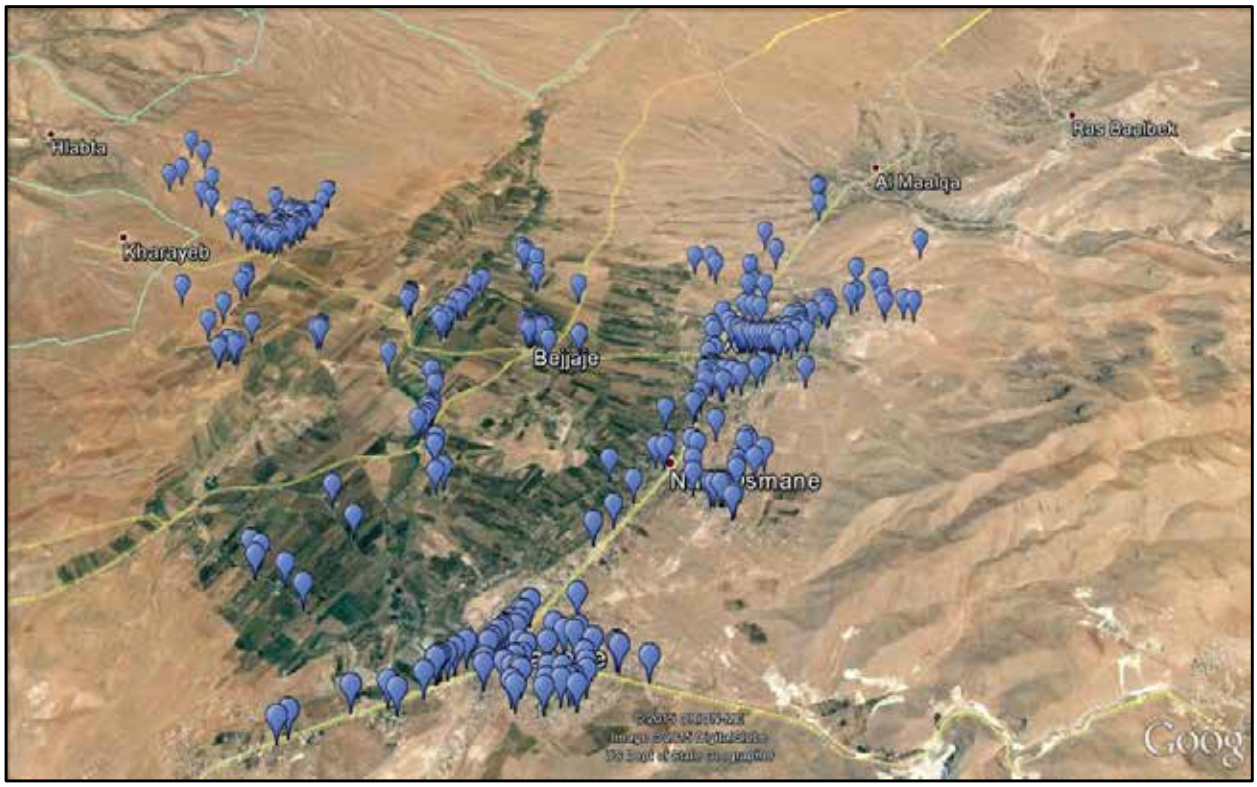
This particular aspect has been considered as not relevant for the finalities of the study that tried to **individuate common tendencies** more than estimate the exact % of occurrence of certain problems for the whole area. For this purpose most of the data are presented mainly just by **frequency tables in order** to show the occurrence of certain particular cases and not in statistical terms.

The survey could be easily used as statistically representative (just by reducing on random basis some cases for overrepresented municipalities) but it has not been considered interesting for the purpose of the study neither for any further development of the study to reduce at this stage the quantity of valuable information already collected.

In the Municipalities where the final objective of the coverage was not 100%, it has been applied a methodology for selection of the households based on **geographical selection**. In the Municipality of Ain, as example, where the objective was 20%, once the first interviewed household was selected the following 4 households on the same road have been discarded. These criteria allow a representation of different areas between the same Municipalities as water services in Lebanon are usually characterized by zoning practices.

From the map it can be noticed the geographic distribution of the sample as covering the whole areas of each Municipality.

It should be noted in any case that not all the data collected are mapped (but just around 30% of them), because of the bad weather conditions (low visibility of satellites) and the limited performance of GPS in tablets.



GPS mapping of the survey

3.2.4 Structure of Citizens/Customers' Survey

The field survey is structured upon 4 different chapters and 13 sections:

CHAPTER 0 – GENERAL DATA ABOUT SURVEYED POPULATION

- S.00 - Personal Data

CHAPTER 1 – ACTUAL COPING STRATEGIES

- S.01 - Storage
- S.02 - Water Network
- S.03 - Water Trucking
- S.04 - Garden
- S.05 - Well
- S.06 - Bottled Water
- S.07 - Table For Weekly Consumption / Cost
- S.08 - Water Conservation

CHAPTER 2 - OTHER PUBLIC SERVICES RELATED TO ENVIRONMENT

- S.09 - Wastewater
- S.10 - Solid Waste

CHAPTER 3 – RELATIONS WITH PUBLIC WATER MANAGEMENT

- S.12 - Willingness To Pay

Section 0 is asking some general data related to composition of the household and information about the respondent. These data are presented in this introductory chapter.

Section 1 can be considered as introductive (or "warm up") to know from questions related to Storage Of Water what are the different sources of water for the household (network, well, truck, bottled water, etc); each of them will be analyzed more in detail in the following chapters.

Sections 2 to 6 are specific chapters to know in detail Different Uses And Sources Of Water at household level and let people start estimating the quantity they are using and their relative costs.

Section 4 (water for gardening) has been inserted just before the questions related to wells, in order to facilitate the following estimation of consumptions from private well.

Section 7 has been the most time consuming part of the survey (but probably also the most interesting and productive) where the people interviewed have been guided through a specific process in order to be able to estimate by themselves the Quantities Of Water used per week, the source of these quantities and their relative costs.

All the values were declared by the interviewees, the surveyors have just been helping in providing the tools to calculate them *(e.g.: "consider that with one minute of shower you consume 10 liters of water, how many shower your family usually have per week? So how many liters consumed for showering in one week?).*

Having gone through the previous chapters facilitated the elaboration of the data for this exercise.

The analysis of the data collected through this section is presented in a specific chapter at the end (4-CONSUMPTION SUMMARY AND COSTS RESULTS TABLES) in order to facilitate the readability of the study.

From chapter 8 to the end, the questions are aiming not only to data collection, but also to receive opinions and suggestions from people in order to better define and propose future public services.

Section 8 deals with Water Conservation general awareness.

Chapter 9 analyzes different aspects of Wastewater and, after investigating actual practices and costs, try to quantify the trend in willing to pay for public wastewater services;

Chapter 10 deals with Solid Waste Management, level of satisfaction of the service provided by Municipalities, comments and recommendations in how to improve the services;

Section 11 is focused on Water Fees and Management of Water Services.

Aspects related to institutional management of water services are collected and also opinion of the people about important elements for defining future strategies for the Establishment.

Particularly important in this chapter are the assessed level of acceptation of water meters and the expected hours of service expected by the population.

Section 12 is the final section, where through a particular technique called "bidding game" it is requested the interviewee to declare his Willingness To Pay in relation to the desired level of service (in terms of hours per day, declared in the previous chapter).

NB: *As already mentioned above, the structure of this report is similar to the one followed during the survey in order to show the whole process of elaboration done by the single household before getting to the final tables about average consumptions and costs.*

3.2.5 Data Analysis

The data have been collected with tablets and a specific ODK survey database developed internally by GVC.

The data have then been transferred in Microsoft excel where main compiling mistakes have been corrected and numeric series have been adapted by excluding external values that could have affected the calculations of average values.

Cleaned data have then been analyzed through the statistical software IBM-SPSS, for creating categories of respondents and produce graphs.

For a reader that does not have much time and would go straight to tangible results, it is recommended to just read quickly the initial chapters and to ***concentrate his attention to chapter 11 and 12 and then to the tables presented in chapter 13.***

3.2.6 Presentation of survey data

The report is presenting only the most important questions and data of the questionnaire. The selection has been done on the basis of

- Information provided by the answer;
- Necessity to show logical sequence of questions for promoting awareness.

Tables with data will be inserted mainly in initial chapters to show how charts have been constructed. Along the report they will be presented just when necessary, as in general it will be preferred the visual representation through graphs.

Not all the graphs have been inserted for each question mentioned in the survey. This choice has been with the objective to simplify the readiness of the document (references are always indicated).

All questions of the survey with relative tables and charts are in any case proposed for reference in Annex. For this purpose, the numbering of paragraphs follows exactly the same numbering and titles used in the questionnaire and are directly linked to Annex 2.

Tables, present usually two columns:
- Percent – Calculated on the basis of the total number of surveyed people (almost always 1006)
- Valid Percent – Calculated on the basis of only the people specifically answering to the question (excluding missing values)

I. GRAPHS

Different kind of graphs will be used within this report with the objective to highlight different aspects of a question.

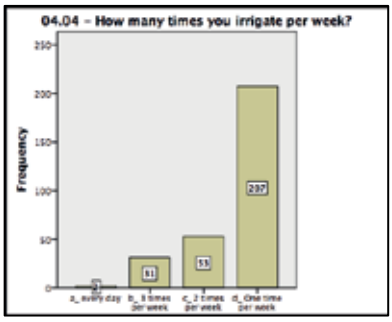
• BAR CHARTS

Bar Charts are mainly used when there are different values that are important to be shown (most of the questions are open) and to stress the frequency of each of them (in terms of occurrence).

Usually missing values are not reported in this kind of graphs.

Labels reported on the bars indicate the frequency of that answer.

Please refer to the example here aside in relation to the frequency of irrigation for the garden.

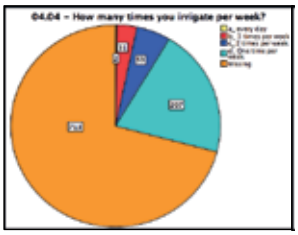


Bar chart example

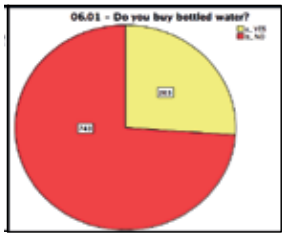
• PIE CHARTS

Pie charts are used when it is more important to show the real weight of certain answers in relation to the total number of people that have been interviewed. Labels reported on each slice indicate the frequency of that answer.

Unaccounted answers values are reported and are important for this purpose (example graph 2).



Pie chart example
with missing values



Pie chart example
YES/NO answers

The same question of frequency of irrigation for gardens, with this kind of pie chart will show that almost 75% (orange part) are missing, mainly because in a previous question they declared to do not have a garden.

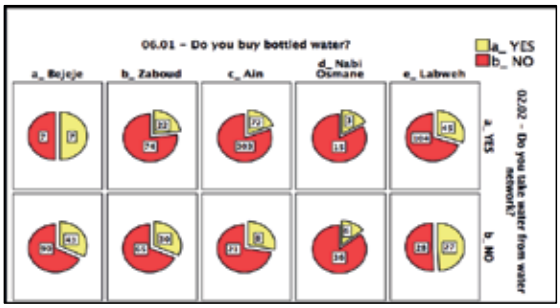
Pie charts are used also when there are YES/NOT answers (example graph 2.1).

Usually red will indicate “NO” and yellow “YES”.

• MULTIPLE PIE CHARTS

Multiple pie charts are provided with the objective to provide more details about an answer.

In this example it is possible to see that answers have been divided by Municipality (columns) but also combined with another question that is indicated in vertical rows “Do you take water from the network? (Division in two rows YES/NO).



Multiple pie charts example

The reading should be done in this way:

- **First row:** between those that are declaring to take water from the network those that are buying bottled water are indicated in the charts of that row;
- **Second row:** between those that are declaring to do not take water from network, those that are buying bottled water are as indicated by the pies on the second row.

As can be seen from these graphs, apart the Municipality of Labwe (where almost 50% of those not receiving water from the network are buying bottled water against an approximate 25% of those that are receiving water from the network) in the other Municipalities the sizes of the pie are mainly similar.

It is important for these graphs to have a look on comparative terms between the sizes of the pies with the same color to have a quick idea of the distribution of the answers. These graphs have as finality to show if there is any particular correlation between different variables and if tendencies are different in any particular Municipality.

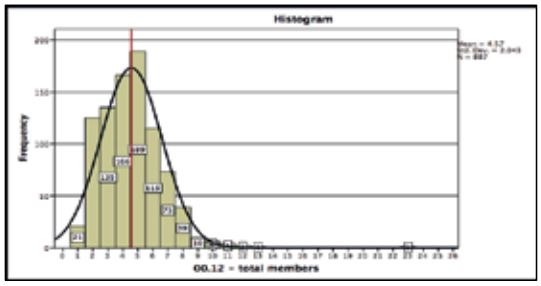
• HISTOGRAMS

Histograms are used when there are numeric values. Histograms are also used when regrouping values in uniform categories.

A curve is indicating the distribution of values and the peak of it the mean value of the series.

A colored vertical line indicates the mean value.

Labels reported on the bars indicate the frequency of that answer.



Histogram chart example

II. UNACCOUNTED ANSWERS VALUES

In many questions there will be missing answers. Main reasons are due to:

- **Grouping:** those that in a previous question declared to do not respond to a certain criteria have not been included in questions related to that topic. As example: those that declared to do not take water from the network have not been asked "how often do you take water from the network?" or "are you satisfied with your water network?". Those values have been reported as "missing" for that question.
- **Possible mistakes of the interviewer.** The ODK software used to conduct the interview does not allow automatic possibility to skip questions when a certain answer is YES or NOT. It is the interviewer that should skip manually the following related questions.
- **Fatigue of the respondent.** As the questionnaire was very long, in some cases the respondent showed signs of fatigues and for certain questions they just asked to skip them. As such reaction was expected, the surveyors have been required to do not be too strict in order to do not annoy the surveyed person.

As mentioned above, it has been considered important, especially with pie charts, **to show also the portion of missing values** in order to have the possibility to better visually estimate what is the real weight of certain answers in relation to the whole interviewed population.

In the tables is often indicated the percent (on totality of the sample) and the valid percent (on totality of people that replied to that question).

III. HOUSEHOLD/COMMERCIAL DISTINCTION

During the analysis of field results it will be often used the terms "surveyed population" or "citizens" or "interviewees" without specifying in particular if it was a private Household or a commercial activity or a public institution. When this clarification was necessary it has been provided.

Some questions related to households sometime were not applicable for commercial activities (as example the number of member of the household) and vice versa.

It will be not stressed in any circumstance this distinction as in most of the cases this is clear enough from the question itself and it would just be a burden for the reader (in any case, in every question the sample basis is indicated).

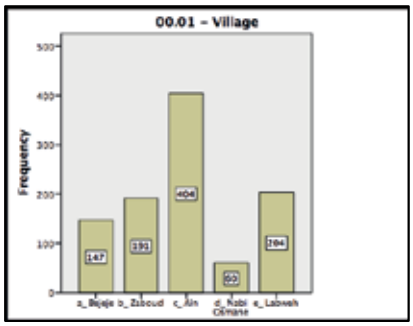
Just when this distinction will be important for analyzing particular aspects then it will be stressed the category of interviewed.

3.2.7 Chapter 0 - General data about surveyed population

Surveys per municipality

A total of **1.006 surveys** have been completed distributed in the 5 different Municipalities upon the following frequency table:

	Frequency	Percent
a_ Bejeje	147	14.6
b_ Zaboud	191	19.0
c_ Ain	404	40.2
d_ Nabi Osmane	60	6.0
e_ Labweh	204	20.3
Total	1006	100.0

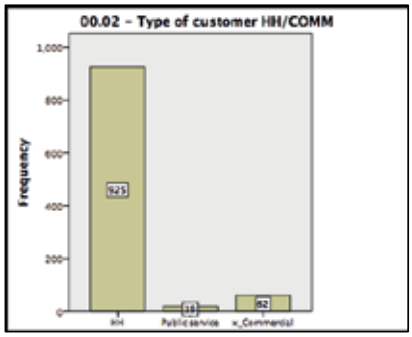


Surveys per Municipality

Categories of respondents

Between the total number of surveys:

- **925** have been realized with **Households**
- **19** with **Public Services** (schools, religious centers, health centers) present in the area
- **62** with other kind of **Commercial activities**

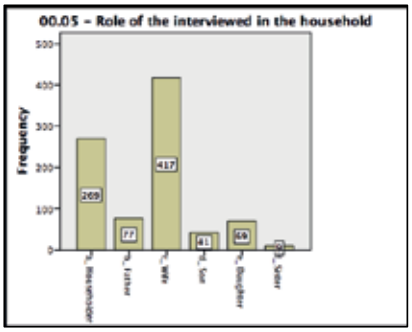


Surveys per category

Description of the respondents

An important percentage of interviews have been conducted directly with the householder (male or female) (26,7%) or the spouse of the householder (41,5%).

Average age of interviewed is **44,32 years old.**



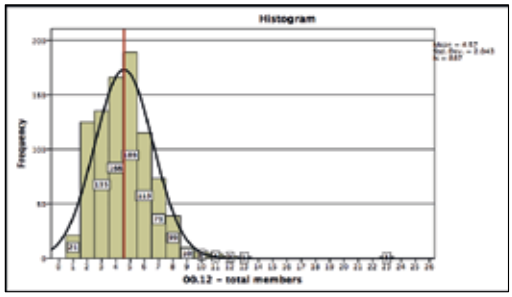
Role of interviewee in the Household

Composition of the household

Average total number of members per households is **4,57** as reported in the graph

The calculated average composition of each household is given by:

- 0,51 components from 0 to 5 yrs old
- 0,98 components from 6 to 17 yrs old
- 2,55 components from 18 to 64 yrs old
- 0,34 components above 65 yrs old



Number of Members per Household

3.2.8 Chapter 1 - Actual Coping Strategies

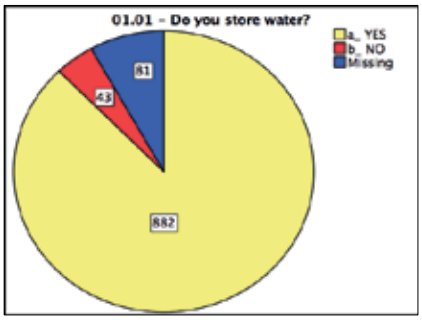
Q.01 Water Storage

- 95% of households have a private storage cistern of an average capacity of 2,5 m3.
- Cisterns are cleaned in most of the cases once a year and practically no one is doing any treatment for the stored water.

S-01.01 - Do you store water?

95% of the people interviewed declare to store water.

		Frequency	Percent	Valid Percent
Valid	YES	882	87.7	95.4
	NO	43	4.3	4.6
	Total	925	91.9	100.0
Missing		81	8.1	
Total		1006	100.0	



Water Storage

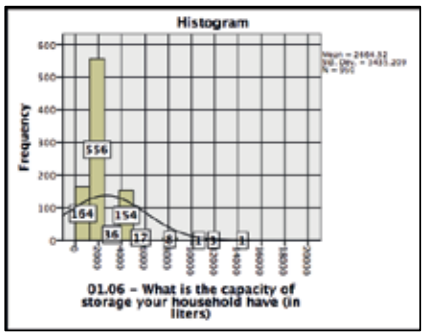
S-01.06 - What is the capacity of storage your household has (in liters)?

Average storage capacity is around **2,5 m3** per household.

94% of the respondents store water **only for their personal use,** while 6% for neighbors or relatives too.

Only 6% stores water for drinking in a separate tank.

This means that in case of different sources of water, not contaminated with other that could possibly be contaminated, the water that will be used for drinking will be in any case contaminated during storage process.

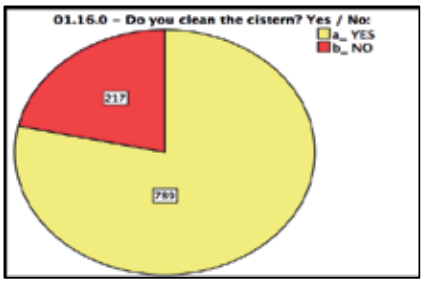


Capacity of Domestic Storage

S-01.16.0 - Do you clean the cistern?

78% declare to clean their own cistern;

Between those that clean their cistern, **76%** of them **clean it once a year.**

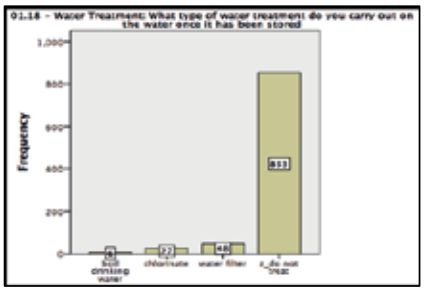


Do you clean the cistern?

S-01.18 - Water Treatment: What type of water treatment do you carry out on the water once it has been stored?

Practically more than 90% of the people do not make any form of treatment for the water that has been stored.

Just 5% use filters, and less than 3% of the people use any form of chlorination.



Water Treatment

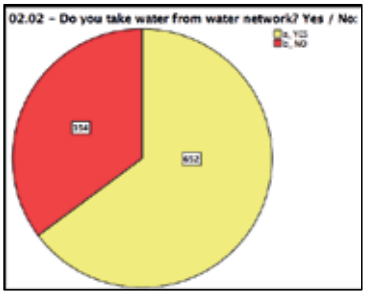
Q.02 Water Network

- People who are connected to network, even with water scheme recently completed or upgraded, receive water on average only once every 2 or 3 days for less than 2 hours. Less than 10% of the sample declares to take water every day.
- Only 30% declares that the pressure is enough to fill the domestic roof storage tanks.
- **75% of the people that are taking water from the network declare to be not satisfied.**
- Main alternatives in case of malfunction of water scheme are private wells or water trucking.
- **72% of people connected to the network, use network water for drinking.**
- Between those who drink network water only 11% use some forms of treatment.
- **76% do not know if water from network is analyzed or not.**
- Among those who declare that water is analyzed, 78% affirm that water is potable.

S-02.02 - Do you take water from water network?

652 people in the whole area (65 % of the interviewees) declare to take water from the network.

	Frequency	Percent	Valid Percent
YES	652	64.8	64.8
NO	354	35.2	35.2
Total	1006	100.0	100.0



Take water from network

It should be paid attention that some Municipalities like Zabboud (covered only half of its territory by a water network) and Bejjeje (practically without network as just few people are connected to Ain) are over-represented within this survey. For this reason it is important to analyze the data of single Municipality. In the following graphs the total populations has been divided by Municipality and by category of customers

It is clear that:

- In Bejjeje practically no one is served by a water scheme (just few household connected at Ain water scheme);
- In Zabboud half of the population is connected;
- In Ain almost everyone is using water from the network;
- In Labwe a slightly minor percentage of people declares to use water from network, but it is interesting to note, that a much higher percentage of commercial activities are not using the network;
- In Nabi-Osmane instead is interesting to note that even if the Municipality is completely covered by a network, less than half of the population declares to effectively receive water from the network.

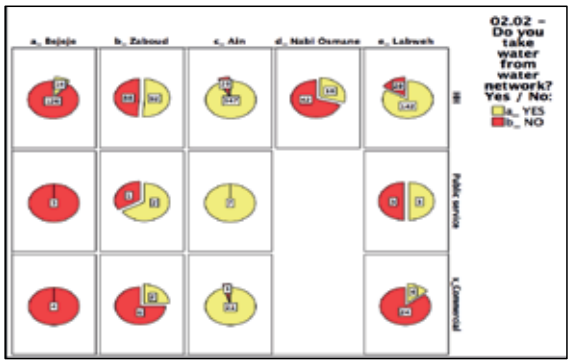
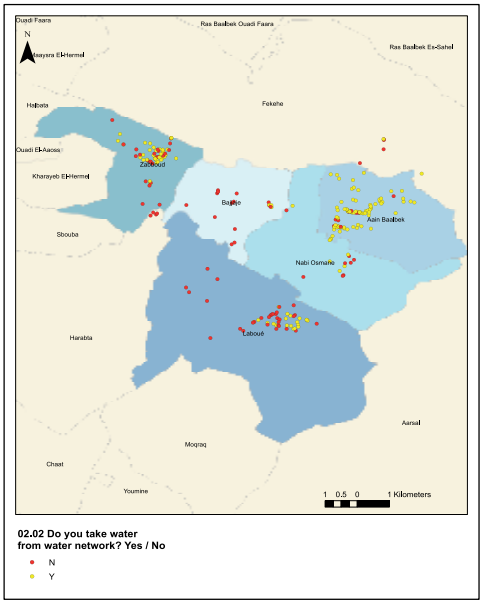


Chart 1 Water from Network by Municipality/Category

Additional geographical analysis could be interesting to show the disposition of the sample. Unfortunately not all the data are mapped but just a small percentage, because of problems of GPS in tablets.

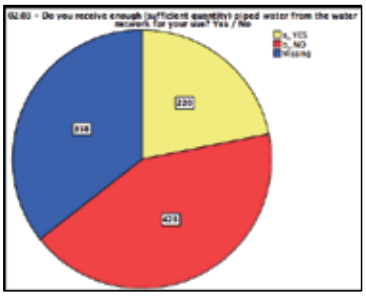
The collected GPS data are from 0,5% in Nabi Osmane up to 2,3% in Ain, so not reliable in statistical terms, but it is interesting to note from the few data available, that even if it could be found a certain correlation between location of the unit and utilization of water from the network, this correlation is not clear and univocal as many red dots (NO) can be found within areas of yellow dots (YES).



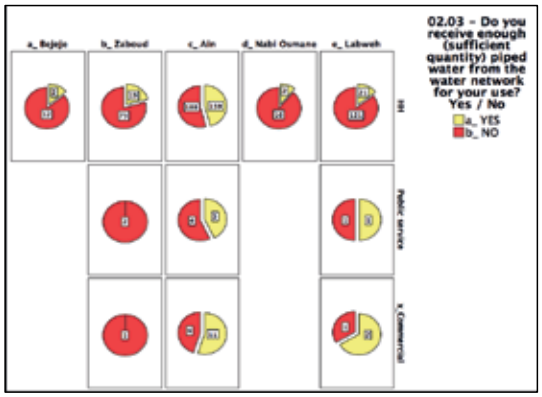
Map of people taking Water from Network

S-02.03 - Do you receive enough (sufficient quantity) piped water from the water network for your use?

Among those who are getting water from the network, 66% of them declares to do not receive enough water;



Sufficient quantity from Network



Sufficient quantity for Municipality

From the analysis by Municipality is possible to understand that the **best situation is present in Ain** where half of the people interviewed (in each category, household, commercial or public services) declare to receive enough water.

From the sizes of the pies is possible to visualize that in all the other Municipalities the % of those that declare to be satisfied is much lower than 20%.

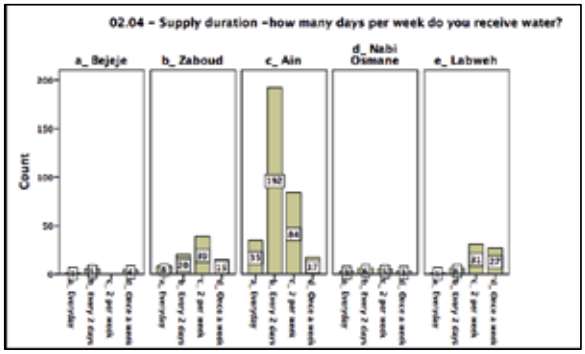
Labwe commercial and public services getting water, respectively 3 and 2, are not statistically relevant to allow any conclusion.

S-02.04 - Supply duration. How many days per week do you receive water?

Among the people who are getting water, the **majority** declares to get water **every 2 days.**

The best performances of the network are in Ain and its values could be over representing the values for the whole area, as in Zaboud and Labwe, it is clear that the majority are taking water only **twice per week.**

What can be stated in any case is that **less than 10%** of the whole sample (among those declaring to use water from network) **is taking water every day** and almost all of them are from Ain.



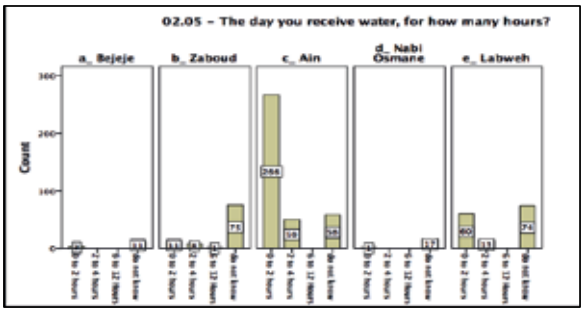
Days per week with service

S-02.05 - The day you receive water, for how many hours?

The number of hours of service, on those days when water is received, is for 52% of cases **between 0 and 2 hours.** The trend is similar in all the Municipalities.

Around **11% is declaring from 2 to 4 hours**, with similar proportion in each served municipality.

There is **no communication** provided to the people **about the timing** of the service (question 02.06.0-1 in appendix).



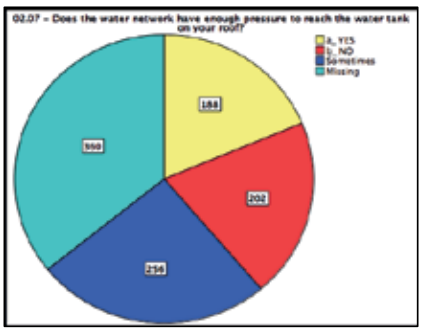
Days per week with service

S-02.07- Does the water network have enough pressure to reach the tank on your roof?

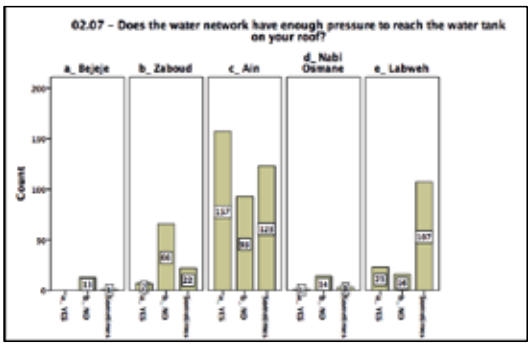
40% declare to receive water with enough pressure to reach their roof storage tank only “sometime”, while **only 30%** declare **yes**.

Most of the cases with good pressure are in Ain (where they are the majority), while in the other Municipalities situation is generally much worst.

These data are confirmed also by question 02.09 where the major problem of the network is, in 78% of the cases, the low pressure.



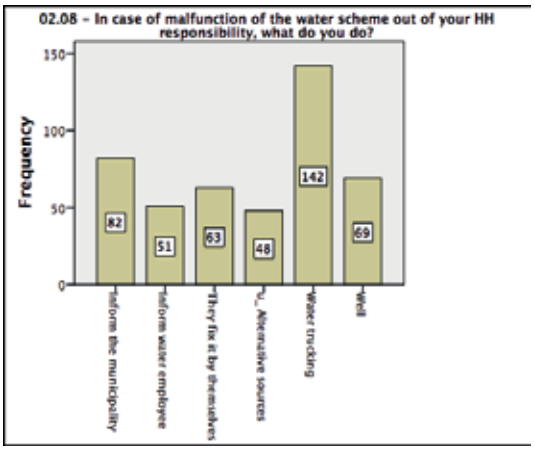
Enough Pressure to reach the tank



Enough pressure to reach the tank by Municipality

S-02.8 - In case of malfunction of the water scheme out of your HH responsibility, what do you do?

In case of a problem with the water network, only 11% of the people concerned inform the employee of the Establishment, while **18% are still referring to the Municipality** and an alarming 14% declares to fix it by themselves. The remaining 57% do not do anything (question 02.08).

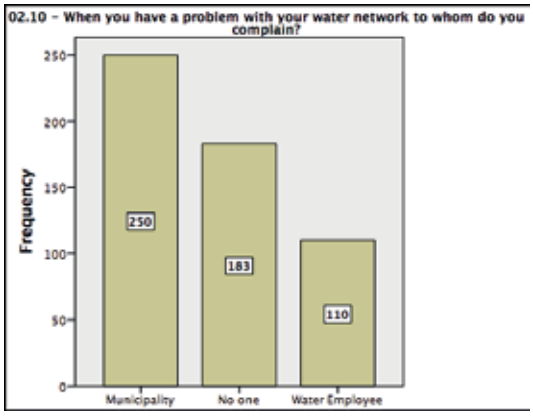


Malfunction of the water scheme

S-02.10 - When you have a problem with your water network to whom do you complain?

As already identified with a previous question, the majority of the people **is still addressing their complaints to their Municipality** instead to the Establishment (represented in any case just by the operator).

There is an important percentage of people who don't react.



Complaint

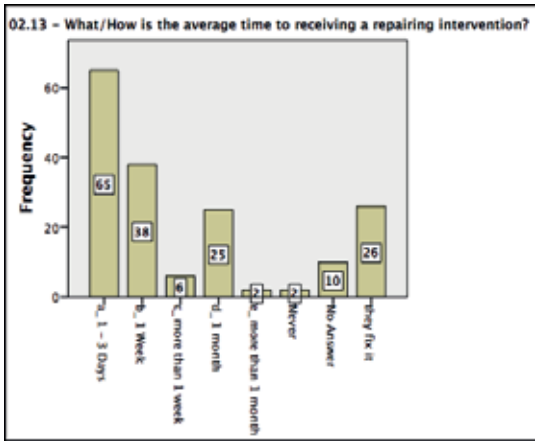
S-02.12 - What/How is the average time to receive a response?

The average time for receiving a response in case of complaint is **1 day only for 20%** of the cases, that can be considered a good indicator, but it should be related to **almost 60% that declare to never receive any answer.**

15% are declaring 1 month.

S-02.13 - What/How is the average time to receiving a repairing intervention when the complaint has been received by the operator?

In case of complaints, most of the cases are fixed within 1 to 3 days or within 1 week.



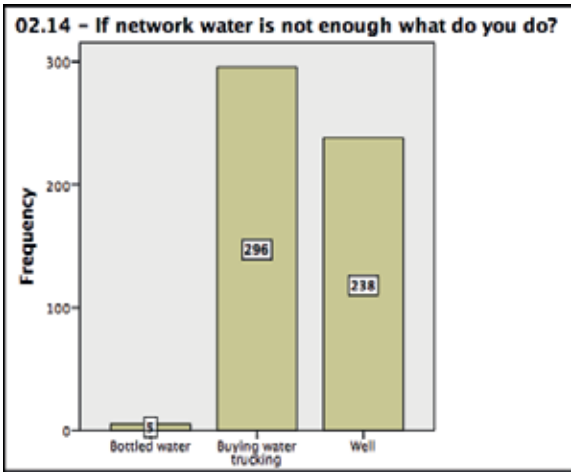
Time for receiving reparation

S-02.14 - If network water is not enough what do you do?

The two major alternatives in case of malfunction of the water scheme are:

- water trucking (54%)
- use of private well (44%)

Consumption of bottled water, with less than 1% does not seem to be much affected by the condition of the network. Similar answers is also given by those who do not take water from network at all: well (40%) and trucked water (41%) are the alternatives, with 6% using bottled water (question 02.24.5).



Alternatives in case of problem with network

S-02.15.4 - How is the quality of water you receive from network? General perception of the water

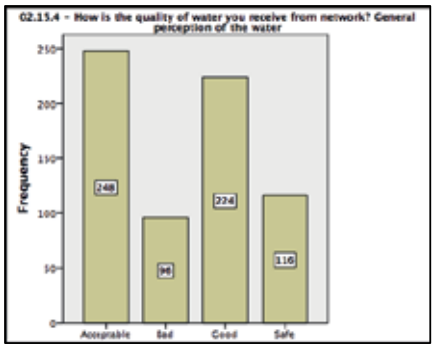
The average quality of the water of the network is considered satisfactory, with 50% of people rating it with positive adjectives.

Only 17% of the people interviewed are rating the quality of water as “bad” and 36% as “acceptable” (that does not mean necessarily potable for all the interviewees);

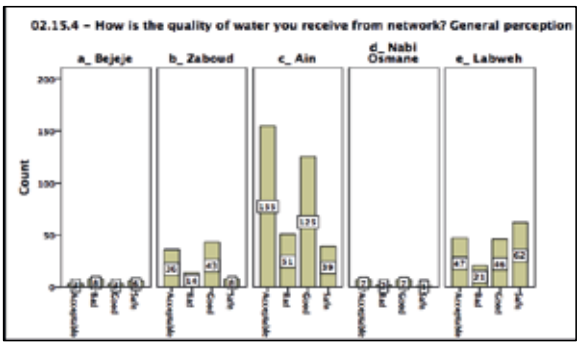
Slightly lower percentages of negative results (around 10%) if we consider separately color, taste and odor (questions 02.15.1 to 3);

Similar trend of answers is found in all different municipalities.

An important percentage of people is considering the water as safe.



Quality of water General Perception

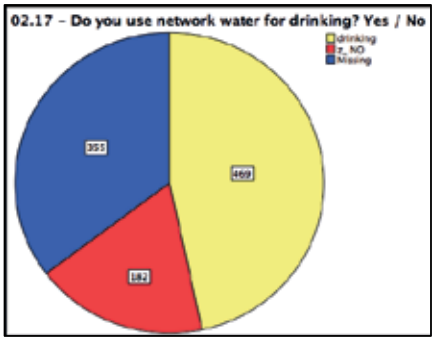


Quality of water per Municipality

S-02.17 - Do you use network water for drinking?

Among those using the water network, around **72% use it also for drinking.**

Among those people only around 11% use some forms of treatment for drinking water. The remaining 89% do not treat the water at all (question 02.16).

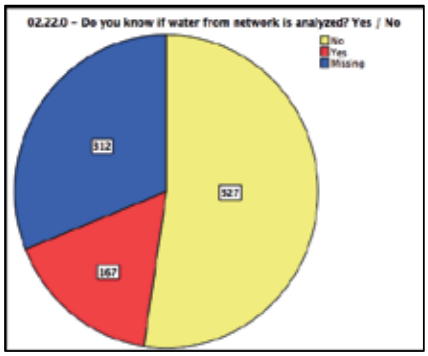


Drinking water from Network

S-02.22.0 - Do you know if water from network is analyzed?

76% of the people (taking water from network) **do not know** if the water from the network is analyzed.

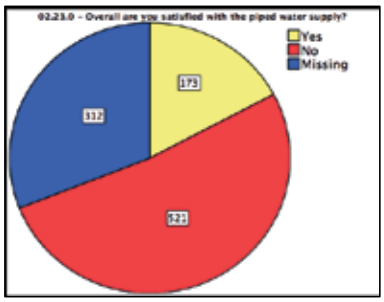
Among those who declare that water is analyzed, 78% affirm that they know it is potable (question 02.22.1).



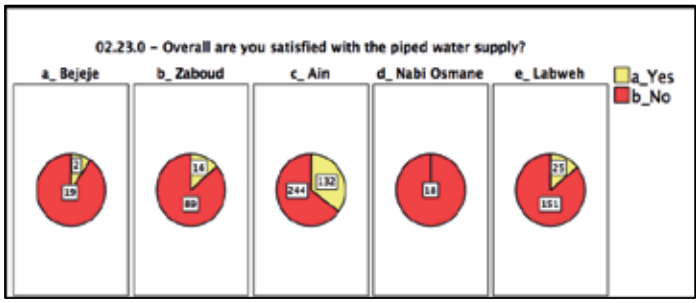
Water is analyzed?

S-02.23.0 - Overall are you satisfied with the piped water supply?

More than 50% of people interviewed are declaring not to be satisfied. If we consider just those who declare to be connected to the network the percentage is getting to 75%. Situation is better in Ain (where in any case the majority is not satisfied), while in the other Municipalities the percentages are similar.



Satisfied water network



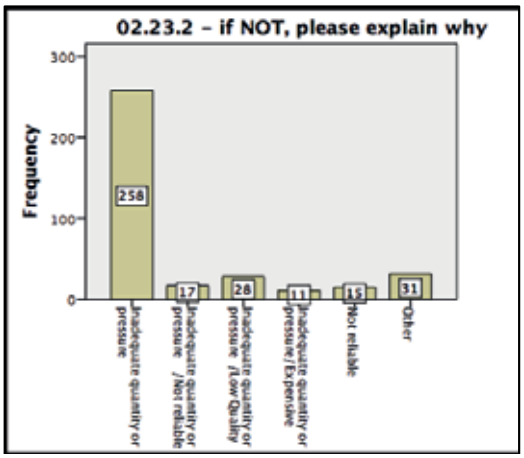
Satisfied with water network by Municipality

Among **those satisfied**, the majority declares (almost 70%) that is **because of the quantity** (question 02.23.1).

Not satisfaction is mainly because of problems related to **inadequate quantity** or pressure (72%).

It should be noted that the cost of the water from network as cause from complaint is mentioned only by 1% of the respondents (question 02.23.2).

The quantity is not mention here as the most important parameter.



Reason for non satisfaction

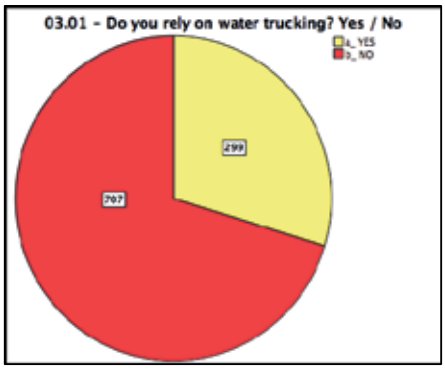
Q.03 Water Trucking

- Almost 30% of the interviewees rely on water trucking
- Water trucking has an average cost of 5.900 LBP per m3

S-03.01 - Do you rely on water trucking? Yes / No

Almost 30% of the interviewees rely on water trucking

		Frequency	Percent	Valid Percent
	YES	299	29.7	29.7
	NO	707	70.3	70.3
	Total	1006	100.0	100.0



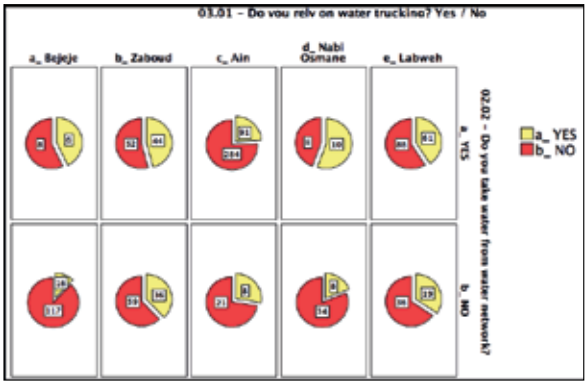
Water Trucking

It is interesting to note that the percentage of people using water trucking is slightly higher among those who are declaring to take water from the network (in each municipality the same pattern).

This can mean that those who do not rely on network found more long term strategy than water trucking; private wells as example.

The **majority is ordering a truck once per week (69%) and another 29%** around 2 times a week (question 03.02).

This pattern is similar in almost all the municipalities apart Bejjeje where only few people rely on water trucking.



Water Trucking by Municipality

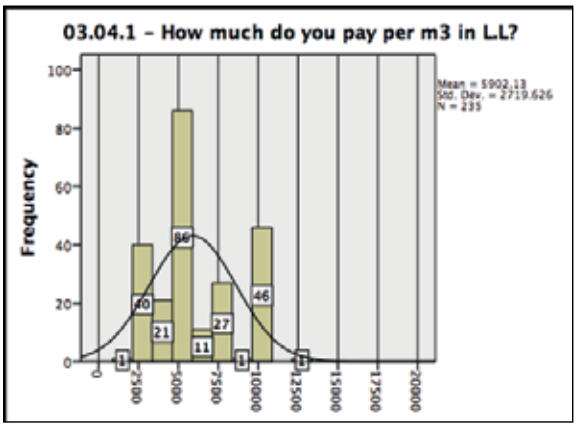
S-03.04.1 - How much do you pay per m3 in L.L?

The average quantity per delivery is approximately **3 m3** (question 03.03).

Average cost **per delivery is 16.000 LBP** (question 03.04.0).

Average cost **per m3** is **5.900 LBP** (question 03.04.01).

To be noticed that these data are given by three different questions with the objective to let people think carefully about their costs and consumptions. For this reason the average cost per m3 is not exactly corresponding to the average cost per delivery divided by average quantity per delivery (that would be 5.300 LBP).



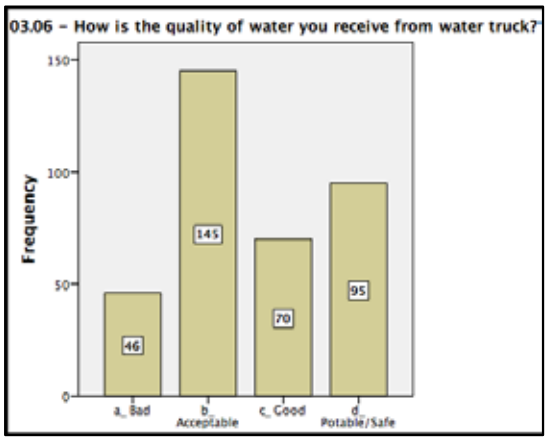
Price per m3 for water trucking

S-03.06 - How is the quality of water you receive from water truck?

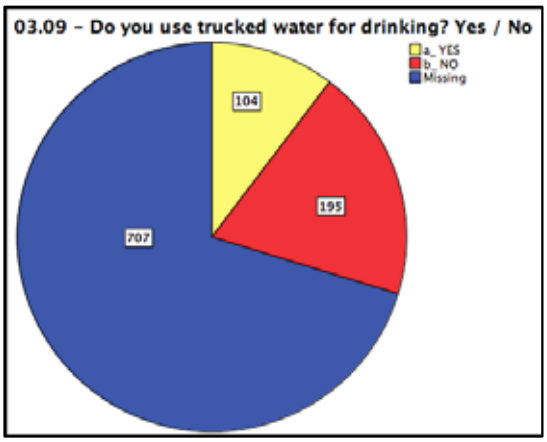
The perception of the quality of water trucking has a pattern very similar to the one of water from network previously commented (question 2.15.4) with 13% declaring it as bad and 41% as acceptable. The value acceptable, as will be shown later, does not mean necessarily potable for the interviewed.

97 % declare to do not treat water from trucks (question 03.08).

35% of those using water trucking declare to drink it (question 03.09). This percentage is lower than for people connected to the public network.



Quality water from trucks

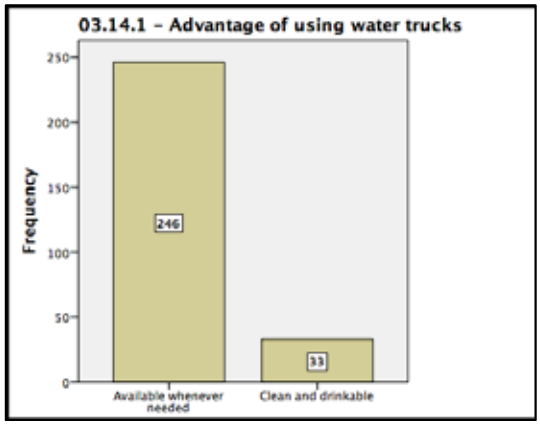


Drink water from trucks

S-03.14.1 - Advantage of using water trucks

Around 72% of the orders of water trucking are dispatched within 3 hours, and 90% of the total within the same day (question 03.05).

It is probably for this reason that 88% of the people using water trucking r needed" against a 12% who are stressing the fact that the water is "clean and drinkable" (question 3.14.1).

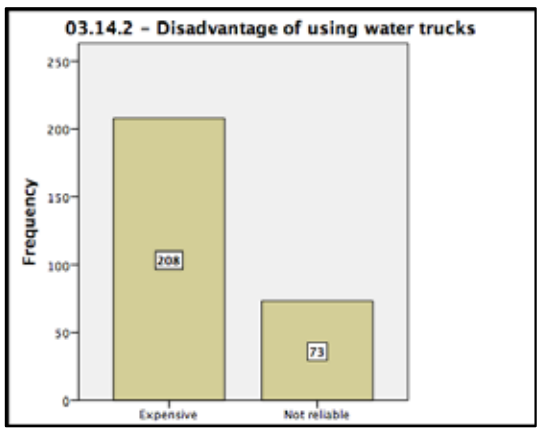


Advantage of Water Truck

S-03.14.2 -Disadvantage of using water trucks

The same people asked about the main disadvantage of water trucking declare in similar percentages that it is "**expensive**" (question 3.14.2).

It is interesting to note in this answer that a relevant number of people (26%) declare in any case that the service is not reliable.



Disadvantage of Water Truck

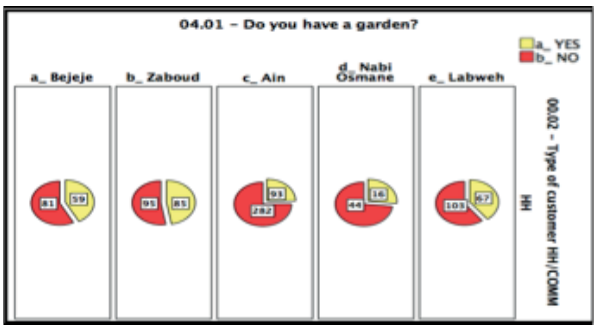
Q.04 Water For Gardening

- Around 55% of those with a garden use water from their own well;
- 8% declare to use water from network.

S-04.01 - Do you have a garden?

Almost 35% of the interviewees has a garden.

		Frequency	Percent	Valid Percent
Valid	YES	320	31.8	34.6
	NO	605	60.1	65.4
	Total	925	91.9	100.0
Missing		81	8.1	
Total		1006	100.0	



Garden per Municipality

It is interesting to note that the Municipalities that are developed mainly on the west part of the valley, on Mount Lebanon side (Bejjeje, Zabboud and Labwe), have an higher percentage of population with garden (almost **45%**).

Those developed mainly on the Anti-Lebanon side have a smaller percentage of people with garden (approximately **25%**).

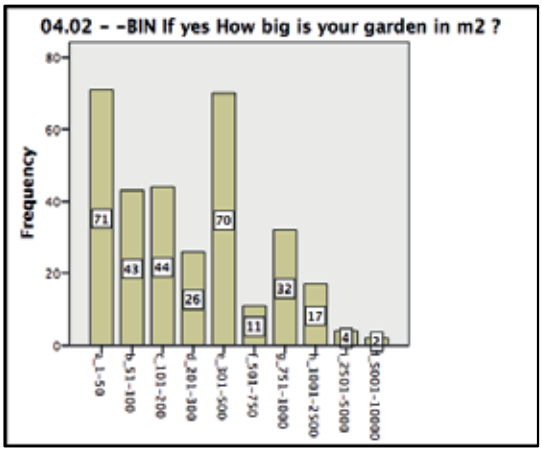
S-04.02.0 - How big is your garden in m2 ?

Average size is 480 m2, but with around 22% with less than 50m2 and almost 50% below 300 m2 (question 04.02.0);

Majority of people have just garden and flowers or trees with **only 4 % having vegetables** (question 04.02.1);

25% of people use **chemical fertilizers** and 21% both chemical and organic fertilizers (question 04.02.2);

70% irrigates once per week, the remaining two or three times (question 04.04).



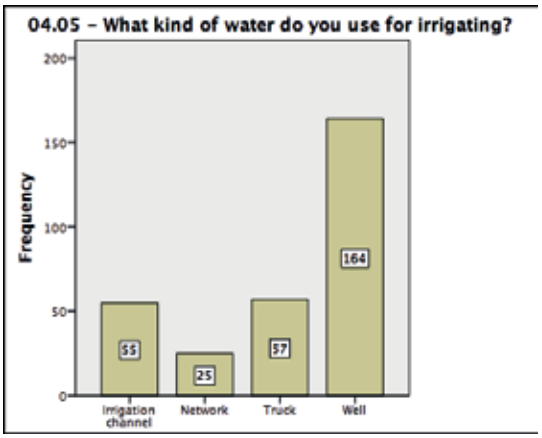
Size of the Garden

S-04.05 - What kind of water do you use for irrigate?

Around 55% of those with a garden use water from their own well;

8% declares to use water from network and 18% from Labwe irrigation channel.

it is interesting to note that around 19% of the cases declare to use expensive water from trucks also for gardening.



Water for Gardening

Q.05 Private Wells

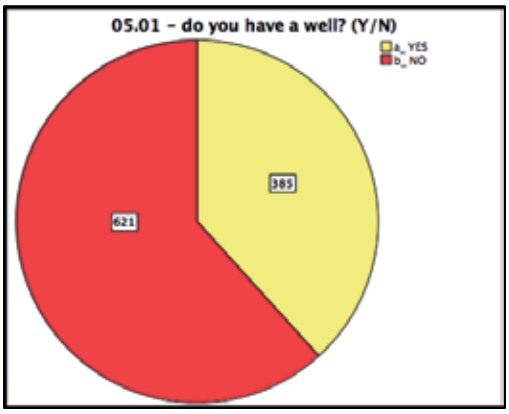
- 38% of the people interviewed have their own well that has been constructed during the last 40 years;
- wells are used to extract an average of 3,6 m3 per week (per household and gardening). Average monthly cost to operate is estimated in 54.000 LBP with 50% of the interviewees who are spending 20-30.000 LBP per month;

S-05.01 - Do you have a well?

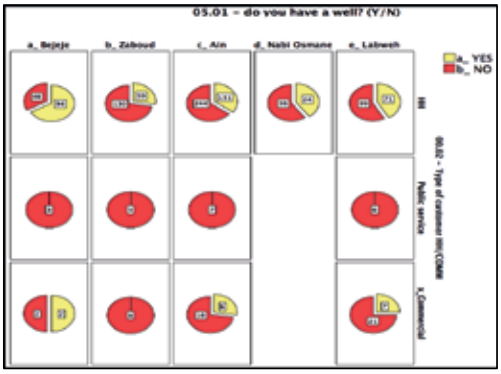
Around 38% of the people interviewed have a private well.

Also some commercial activities have their own private wells.

		Frequency	Percent	Valid Percent
Valid	YES	385	38.3	38.3
	NO	621	61.7	61.7
	Total	1006	100.0	100.0



Well



Well by Municipality

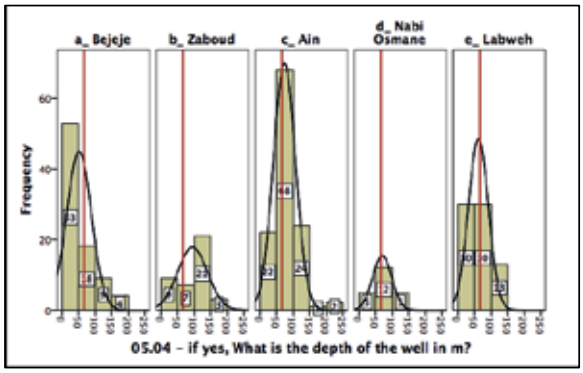
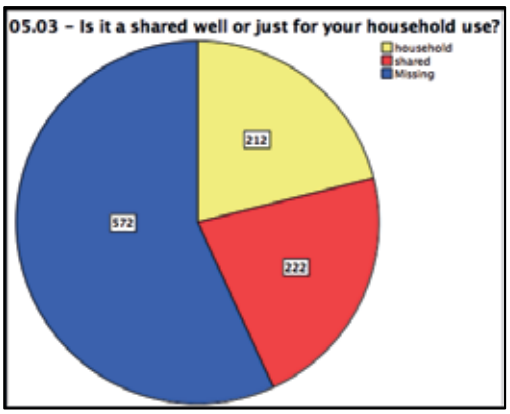


Figure 1 Average Depth of the well

Some villages like Bejjeje have more wells than the others but this can be related to the lack of network, but also to the average depth to find water that in Bejjeje is below 50m (question 05.04) while in **average is 67 m for the whole area.**

Almost half of the total wells are shared with neighbors or relatives (question 05.03).

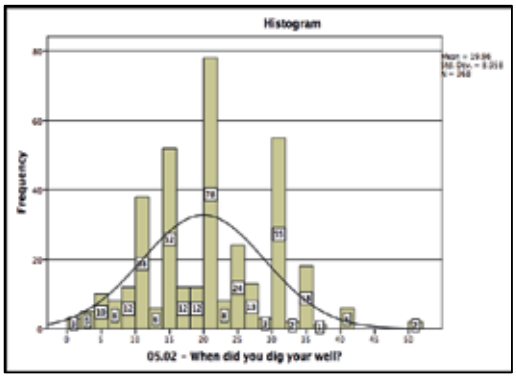


Shared Well

It is interesting to note that almost all the wells have been dug **during the last 40 years**, temporal period coinciding with the civil war in Lebanon and they have been dug to have access to safe water or because other sources were not present (question 05.05).

Most of the well (60%) are **equipped with a 1 inch** diameter pump, and a 25% with pumps between 1,5 and 2 inches (question 05.08).

The average distance of the well from the pit is 83 m, but there is a consistent number of pits (> 50%). located at less than 50 m from the well.



Year of the well

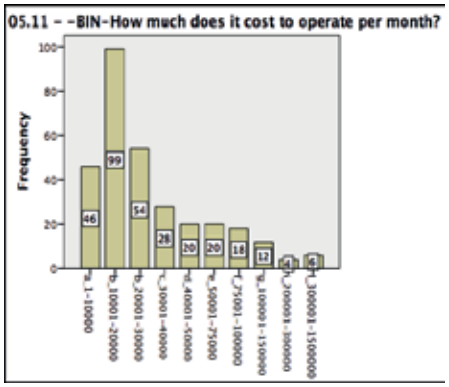
S-05.09 - How many times per week do you use your well?

35% of the people use it **just once a week**, but the **average value is 2,5 times per week** (question 05.09) and almost everyone uses it less than 1 hour each time (question 05.10).

Average cost to operate it is **54.000 LBP** per month (question 5.11), but range of values is very spread and the majority of people spends **between 10.000** and **30.000 per month:**

- Up to 10.000 (15%)
- From 10 to 20.000 (32%)
- From 20 to 30.000 (18%)

C



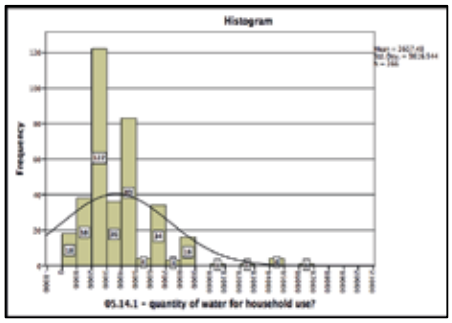
Cost for operating the well

S-05.14 .1 - Quantity of water from well for household use per week?

The average quantity of water pumped for household use is **3,6 m3 per week.**

The majority of households (almost 50%) use it for less than 2 m3 per week.

An average of 2,7 m3 of this water are considered to be used for gardening (question 5.14.2) with more than 50% of interviewees using less than 1 m3 for this purpose.



Quantity of water from the well

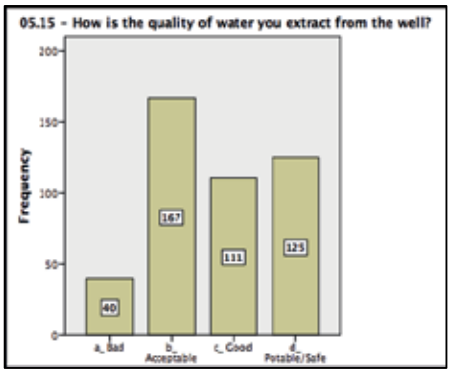
S-05.15 - How is the quality of water you extract from the well?

Perception of quality presents trends similar to those of water from network or from truck, but the values are in general higher:

• only 9% perceive it as bad (against 13% for network and truck)

• 38% as acceptable

• more than 53% rate it with more positive values



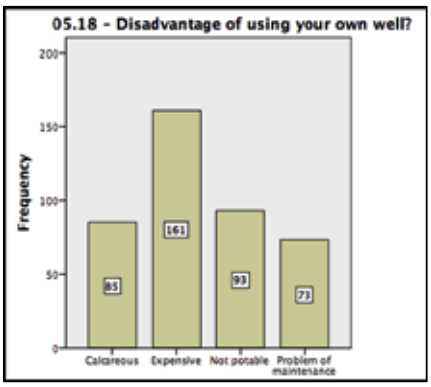
Quality of water from well

S-05.17 - Advantage of using your own well?

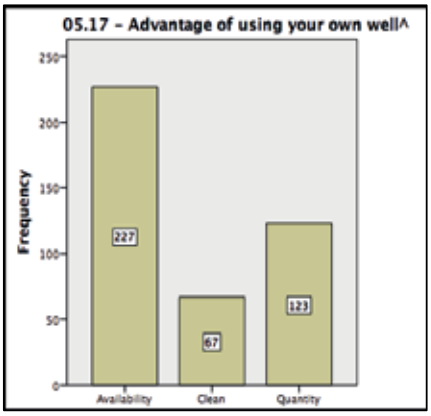
Availability is considered the most important advantage of using a well (54%) before quantity (30%) and cleanliness of the water.

When asked about disadvantages, it is interesting to note that the problem of price of water is perceived by almost 58% (including maintenance in this category). The remaining 42% declares problems with the quality. This value is in contrast with the previous rating of water where just 9% declared the quality of water as bad. This could mean that the rating of water as "acceptable" for people does not mean at all potability.

Private wells are often considered as competitors of the service provided by the network, it is reasonable to think that if the water from network could improve its performances in terms of availability and reliability of the service, as in terms of quality perception, the price of the service could for sure be more than competitive with the one of the well.



Disadvantage well



Advantage well

Q.06 Bottled Water

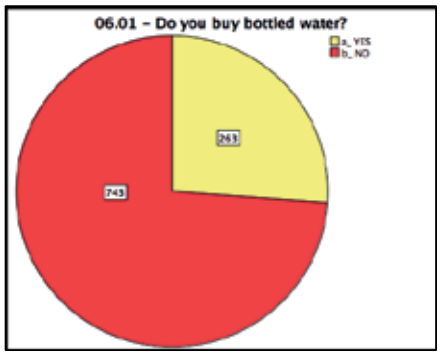
- Only 26% of the sample is drinking bottled water for an average cost of 15.400 LBP per week;

S-06.01 - Do you buy bottled water?

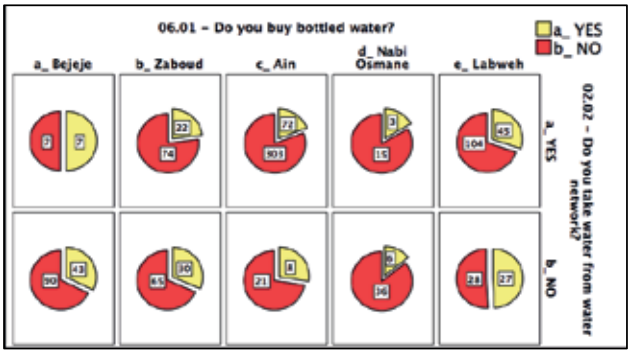
The total % of people buying bottled water is **more than 25%.**

	Frequency	Percent
YES	263	26.1
NO	743	73.9
Total	1006	100.0

As shown from the graphs, percentages are similar in every village and are not much influenced by availability of water from network (just a small correlation can be identified).



Bottled Water



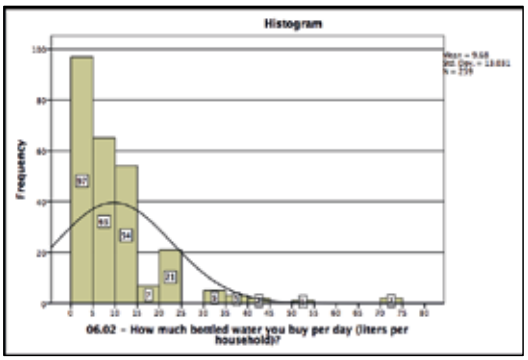
Bottled water per Municipality

S-06.02 - How much bottled water you buy per day (liters per household)?

Average consumption per household per day is 9,7 liter, with almost 50% buying less than 5 liters;

82% buy sealed bottled water (question 06.04) and half of them declare to re-use (or re-fill) the bottles once used (question 06.05);

The average expenditure per household for bottled water is **15.400 LBP per week** (question 06.03);



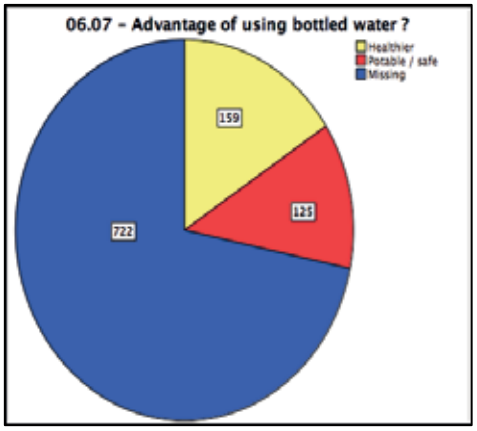
Bottled water consumed per Day

S-06.06 - Why do you buy bottled water?

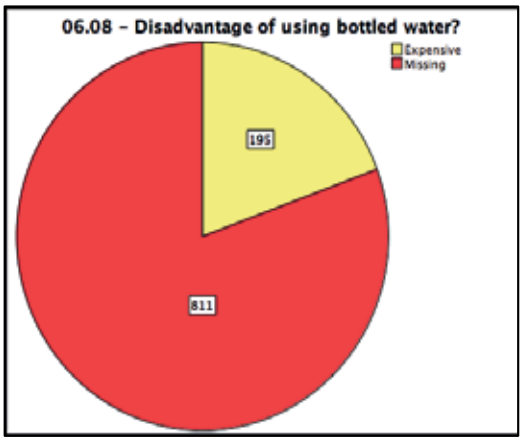
80% of the people declare to buy water because is **potable**. Among them it is interesting to note that 40% mentioned that it is **healthier for children** (question 06.06).

The most important advantage is that it is considered **potable** (question 06.07).

As disadvantages everyone mentioned that it is **expensive** (question 06.08).



Advantages Bottled Water



Disadvantages Bottled Water

Q.07 Average Water consumptions and Costs

This chapter comes after having investigated the different water sources, consumptions and relative costs and at the same time having allowed the interviewed to deeply think over its behavior in relation to water.

At this stage the interviewed is put in front to an empty table like the one here reported that should be **filled by pen on the paper** in order to improve participation and visualization of the data.

AVG CONSUMPTION / COSTS TABLE							
area:							
name of interviewed							
Consumptions per week	***unit***	**NETWORK**	**TRUCKED WATER**	**PRIVATE WELL**	**BOTTLED WATER**	**OTHER SOURCE**	**TOTAL** *(calculated)*
DRINKING	*lt / week*						
BATHING/ WASHING	*lt / week*						
CLEANING HOUSE	*lt / week*						
CLEANING VEGETABLE	*lt / week*						
COOKING	*lt / week*						
GARDENING	*lt / week*						
FLUSHING TOILET	*lt / week*						
CLEANING CAR	*lt / week*						
OTHER USES	*lt / week*						
TOTAL LITERS PER WEEK *(calculated)*	*lt / week*						
COST PER WEEK *(declared)*	*LBP /HH/ week*						
TOTAL COST PER MONTH per HH *(Calculated)*	*LBP /HH/ month*	-	-	-	-	-	-

All the white cells have been requested to be filled by the interviewed with the support of the interviewer in order to know:

- **average consumptions** per week for different uses;
- **source** of these different quantities of water
- **estimated cost** for each quantity of water in relation to its source.

This exercise has been conducted with a pure awareness objective:

- to let people think deeply about their water balance.

Some particular driving instructions have been given to the surveyors, in order to facilitate the estimation of some categories of consumption by the citizens/customers, as examples:

- Flushing toilet: 12 lt for each flush;
- Cleaning the house or the car: 12 liters per bucket (if they use buckets) or 10 lt/min if they use the pipe;
- Gardening: 10 lt/min by using the pipe;
- Bathing/washing: 10 lt/min;
- Clean vegetable: 1 lt /10 sec;
- Cooking and drinking the estimation was easier and left to the citizen/customer without standards.

It should be stressed that the interviewed has been requested to take in consideration as much as possible a normal week by trying to calculate a year-round average that would take in consideration differences due to dry season (especially for water trucking and use of the well)

The average expenditure considered for water from water scheme has been calculated by showing to the household the annual subscription fee (230.000 LBP per year) divided by 52 (4.420 LBP per week). It has not been considered the daily cost of 1m3 (630 LBP) as indicated in the subscription fee, as in most of the cases this is not received and it is not representing the real cost afforded by the household.

The interviewed usually mentioned values between 3 to 5.000 per week for the water from network.

This exercise obviously has constituted a **major awareness** for all the surveyed as many (more than 1.000 households in the area) are now much more **aware about their real water consumption patterns** and will be more able to relate them with costs.

The **exclamation of surprise** of many of the interviewed when they realized how much they were spending per month for water (especially for bottled water that they use to buy day per day), was a good indicator that the awareness exercise has been effective.

GVC did not have the expectation to have detailed figures, but just rough estimations, considering the "difficulty" to collect these data with such level of detail.

What was really surprising at the end of the survey, elaborating the whole amount of data, was the fact that **aggregating the data** all the figures in relation to:

- average consumption per capita (145 lit/capita/day)
- average cost per household per month (69.000 LBP/month)

were completely in line with other major reports published in the past from different studies (Icea-Corail 2004; World Bank 2009; National Water Strategy 2012; etc) in terms of quantity and in terms of cost.

What is the additional value of the data collected is the **level of detail** that can allow the elaboration of many different scenarios. Further elaboration on the data collected with this exercise is referred to **chapter 4** where more deep analysis have been conducted.

Q.08 Water Conservation

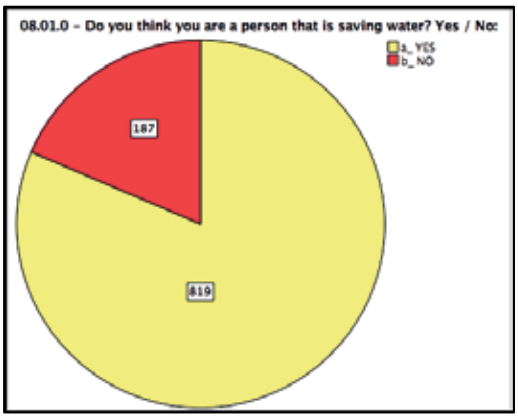
- Awareness about water conservation is lacking in the whole area, but more than 30% of the interviewees recognize that waste from privates is one of the main causes of water shortages.

S-08.01 - Do you think you are a person that is saving water?

81% of the people declare to be people who save water;

When asked how do they save water, the majority affirms just generic answers like “by using water only when needed” or “by closing the tap”, meaning that **there is no real clear awareness about the concept of water conservation** in the area (question 08.01.1).

For those that declared not to save water, when requested how they could save some water, it is interesting to note that almost **40%** mentioned that **savings could be achieved by decrease the quantities while cleaning the house** (question 08.01.2).



Water Conservation

3.2.9 Chapter 2 - Other Public Services Related To Environment

Q.09 Wastewater

- **93% of people have a pit** with sizes getting up to 40-50m3;
- Most of the people never desludged them yet, but those with smaller sizes declare to do it once a year for an **average cost of 78.000 LBP**;
- Assessed **willingness to pay for wastewater is 15.800 LBP per household per month**. This value is less reliable (because of the methodology of enquiry) in relation to the one for water service;
- 96% of the people declare that they would **not re-use** wastewater for irrigation, and **59% even if it would be treated;**
- Half of the people recognize as responsible for wastewater the Government, while the other half still see as responsible the Municipality;

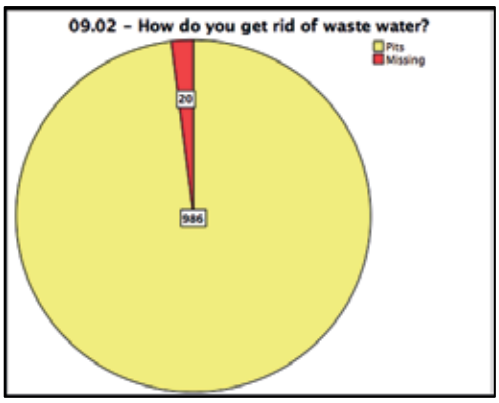
S-09.02 - How do you get rid of wastewater?

98% of people in the area declared to use a pit, even if later to a following question only 93% of the interviewed declare to own a pit (question 09.10);

The pit is defined as "sealed" only by 12% of the owners, while all the others replied that it allows infiltration in the soil (question 09.12);

The average size is surprisingly around 44m3 (question 09.11) and the size seems not dependent on the Municipality;

Those that do not have a pit (5%), declare that it is because lack of money (question 09.21) and mentioned as alternative solution "outside" or "far land".

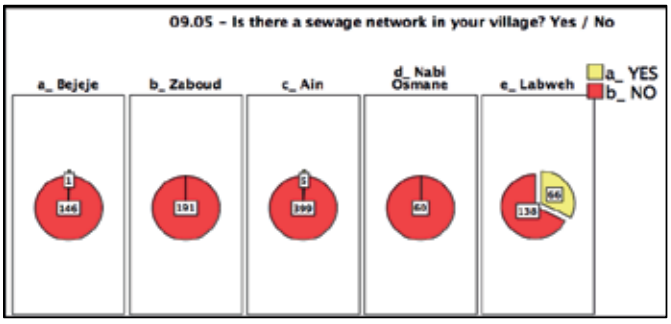


Actual Wastewater solution

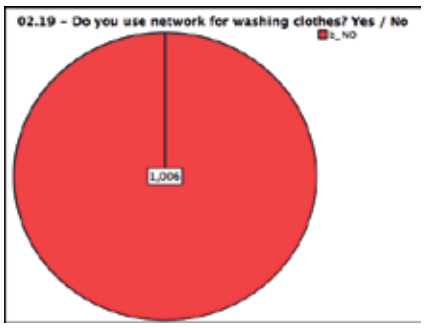
S-09.05 - Is there a sewage network in your village?

It is interesting the answers given about the presence of a sewage network in the Municipality.

In Labwe, almost 30% declare that there is a network while the remaining part declares "no".



Presence of Sewage network by Municipality



Connected to Sewage network

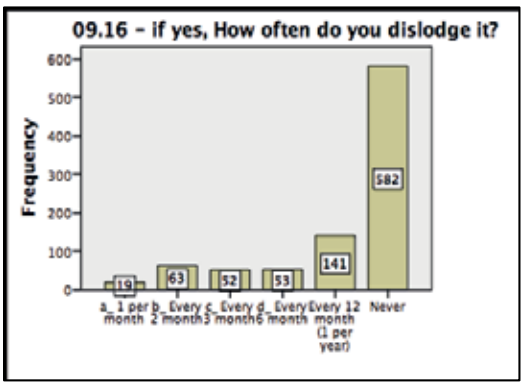
When requested then if they are connected no one replied to be connected (to be reminded here that the sample taken was spread also on geographical basis).Upon local authorities, the construction of the network started few years ago but it has been suddenly interrupted in its initial stage. Today no household is connected to a sewage network, but some citizens still think that some other areas of the municipality, far from where they live, are served.

S-09.16 - if yes, How often do you dislodge it?

When asked about the frequency of emptying their pit it results that around **64% of the people never desludged** their pits while between the remaining, 50% declares once a year (question 9.16) and the others more frequently;

Average cost is **78.000 LBP** per dislodgment (question 09.17.0) and 63% of those having a pit considers this cost as not expensive (question 09.18);

90% of interviewed do **not have idea where** the contents of the pits is **released** by the trucks (question 09.19)

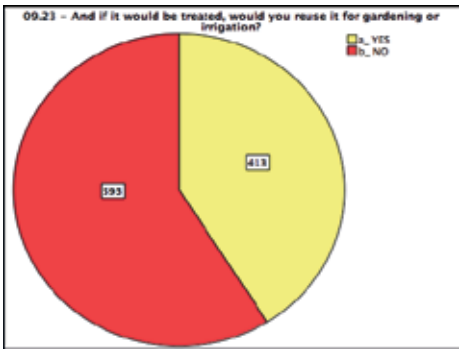


Frequence of dislodgement

S-09.22 - Would you reuse wastewater for gardening or irrigation?

96% declares that they would not reuse wastewater for irrigation (question 09.22);

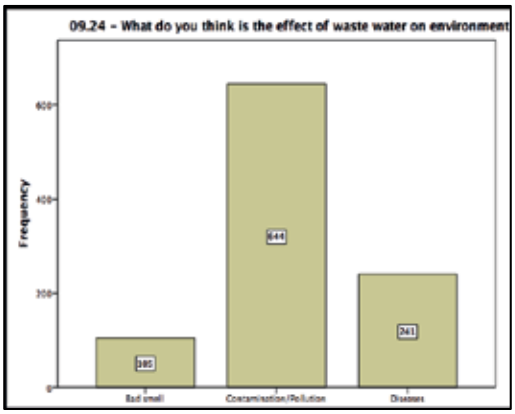
In case it would be treated an important 59% of the people still declare that they would still not use it for gardening or irrigation (question 9.23).



Reuse of wastewater for irrigation

S-09.24 - What do you think is the effect of wastewater on environment in general?

The majority of the people is aware of the relation between effects of wastewater in the environment and **24%** connect it directly with possible diseases (question 9.24);



Effects of wastewater on environment

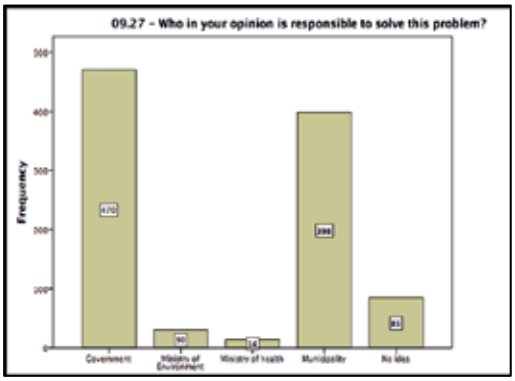
S-09.26 - What is in your opinion the best solution to deal with wastewater?

95% of the population replied wastewater network, and between them 25% specified directly a treatment plant (question 9.26);

When asked who is the responsible to solve the problem of wastewater (question 9.27):

- **more than 50%** mentioned the **Government** or other Ministries;
- 40% replied the Municipality.

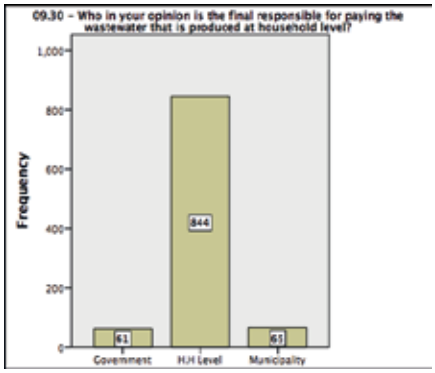
It should be stressed that no one mentioned the Water Establishment (as should be by NWS)



Responsible for Wastewater

S-09.30 - Who in your opinion is the final responsible for paying the wastewater that is produced at household level?

87% declare that should be the **Household** the final responsible for paying for wastewater (question 9.30)



Responsible for paying wastewater services

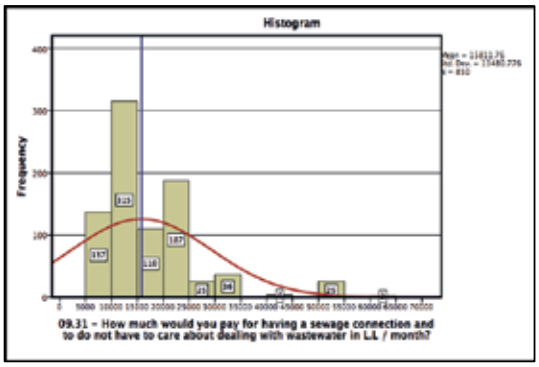
S-09.31 - How much would you pay for having a sewage connection and to do not have to care about dealing with wastewater in L.L / month?

The average amount is 15.800 LBP per month

It should be stressed that this willingness to pay, even if assessed after having promoted a **process** of re-elaboration of general costs by the interviewed, could be considered less reliable that the one later assessed for water.

This is mainly due to the fact that only 40% of the people are actually incurring in costs related to operation of their pits;

The remaining percentages invested already quite some money for building their own pits, but considering the huge size of them, the operational costs cannot still be considered relevant for them.



WTP for Wastewater

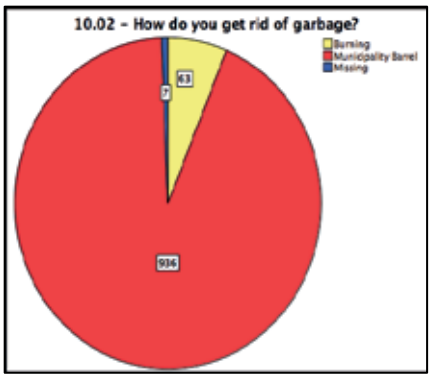
Q.10 Solid Waste Management

- 94% of the interviewees use barrels installed by Municipality to get rid of solid waste, while **6% is still burning it;**
- There is no recycle at all, while **61% declare to reuse organic waste** to feed animals;
- Service of collection is provided on **average twice per week;**
- The role of the Municipality in this sector is recognized and **68% rate the service as good enough** even if people claim for a more frequent collection and bigger barrels.

S-10.02 - How do you get rid of garbage?

Almost 94% of the people use barrels installed by the Municipality to get rid of their garbage (question 10.02);

The remaining 6% is still burning their garbage;



Method for disposal of garbage

S-10.05 - Do you reuse any items?

Organic waste is recycled to feed animals by almost the totality of the population (question 10.04);

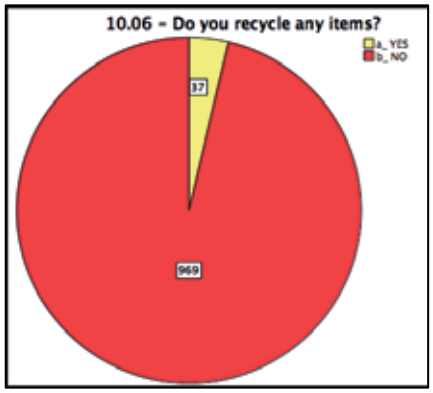
61% of the people declare to re-use items (question 10.05), but less than 4% declare to recycle anything (question 10.06);

When requested if they know where the garbage is then disposed, practically no one is aware about:

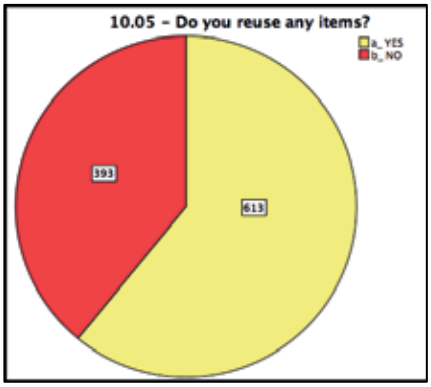
• 44% declare a “far place”;

• 56% “no idea”

A more integrated approach in the awareness seem necessary to link all the aspects of the environmental management.



Recycle



Reuse

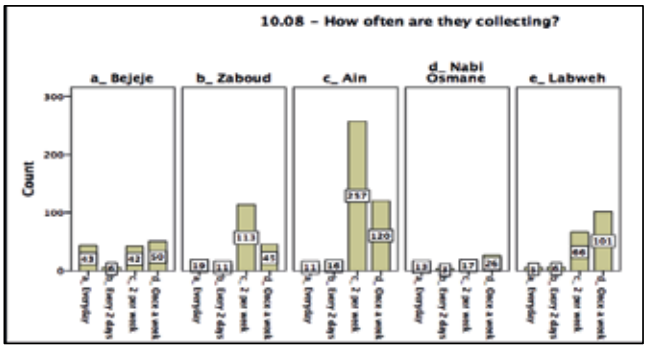
S-10.07 - Who is collecting the garbage?

Municipality is recognized as actor collecting the garbage wherever there is collection, **97,4%** of the cases; the remaining **2,6%** declares “no one” (question 10.07)

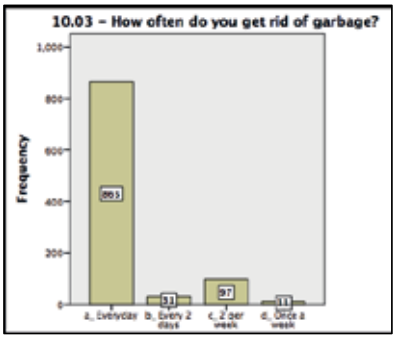
S-10.08 - How often are they collecting?

The rate of collection is in the majority of the cases twice per week (51%) or once a week (35%). The pattern is slightly different depending on the municipality *(question 10.08):*

- in Nabi Osmane and Labwe the tendency is once per week;
- in Zaboud and Ain twice a week;
- in Bejjeje a third of the interviewers are declaring that the service is provided everyday.



Frequency of garbage collection



Frequency of household garbage disposal

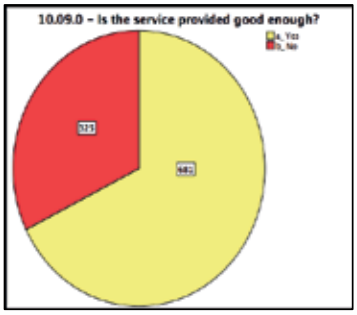
The majority of the people (86%) in any case get rid of their garbage everyday, against a 10% that do this twice a week (question 10.03).

S-10.09 - Is the service provided good enough?

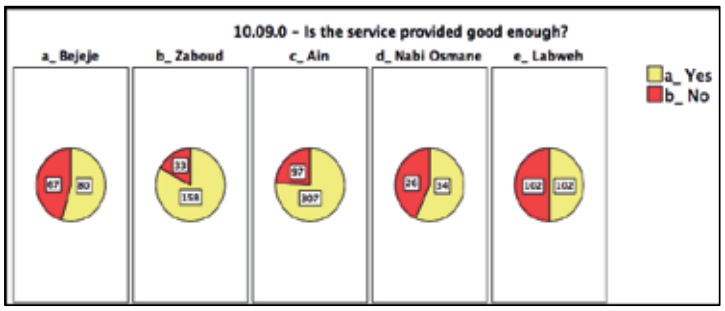
68% of the people declare that the service provided by Municipalities in relation to solid waste management is **good**.

If we analyze the same answer by municipality it can be stated that in all of them more than half of the respondents define the service as good. Some Municipalities perform better, like Ain and Zaboud, other have lower scores *(question 10.09.0);*

It can be stated that when the service provided is good enough, people recognize it;



Satisfaction about the service



Satisfaction by Municipality

The reasons for satisfaction are mainly related to an appreciation for the improvement of the environment (68% summing "clean" and "better than burning") and by the frequency and reliability of the service (32% of the answers) *(question 10.09.1)*

Reason for complaints for those rating the service as no good, are mainly related to lack of reliability or low frequency of the service, or because some areas are not covered *(question 10.09.02).*

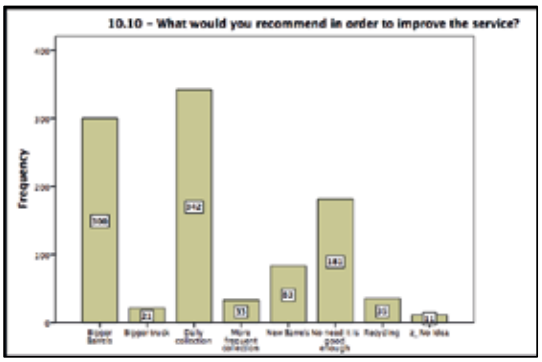
S-10.10 - What would you recommend in order to improve the service?

When requested how they would improve the service:

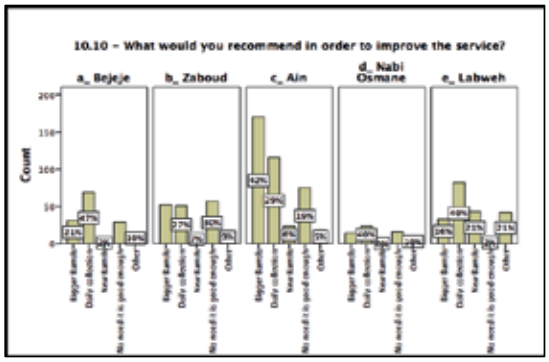
- **35%** insisted on a daily collection;
- **38%** requested bigger or new barrels;
- **Only 3,5%** asked for recycling;

- An important **18%** of the people said that the service **is good enough** and there is no need to improve it.

- The last category confirms the fact that where the public service provided is reliable and perceived as good (in Zabboud 30% and in Ain almost 20%) **citizens do recognize it.**



Recommendations about Solid Waste Service



Recommendations by Municipality

3.2.10 Chapter 3 – Relations with Public Water Management

Q.11 Water Subscription And Management

- Water subscriptions rates are changing from one Municipality to another and are not just depending on the extension of the network. For completely covered municipalities they can range from 27% to 83%.
- New schemes or recently renewed schemes do not necessarily imply higher subscription rates.
- Between those who are taking water from network, 20% declare not to pay any fee at all.
- 91% of people are in favor of the introduction of water meters and 85% declare that they could be useful for improving management.
- 84% declare that situation got worst during last year, but just 53% because of lack of rain; 38% attribute this to bad management.
- Demanded hours of service from the network is in most of the cases (65%) just 2h per day, or 6h (24%), only 7% is demanding 24 h service.

S-11.01 - Do you have water subscription?

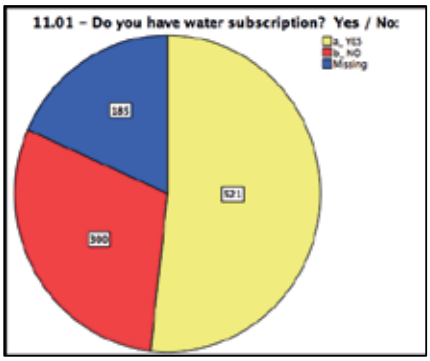
64% of the interviewees declare to have a water subscription.

The data are here presented divided by Municipality in order to have a statistically relevant figure for each Municipality. What should be noted are just the positive value **"YES"**, as for this question, "NO" and Missing values should be added and considered as negative answer:

			Frequency	Percent
a_ Bejeje		a_ YES	11	7.5
		b_ NO	37	25.2
		Missing	99	67.3
	Total		147	100.0
b_ Zaboud		a_ YES	86	45.0
		b_ NO	62	32.5
		Missing	43	22.5
	Total		191	100.0
c_ Ain		a_ YES	335	82.9
		b_ NO	57	14.1
		Missing	12	3.0
	Total		404	100.0
d_ Nabi Osmane		a_ YES	16	26.7
		b_ NO	20	33.3
		Missing	24	40.0
	Total		60	100.0
e_ Labweh		a_ YES	73	35.8
		b_ NO	124	60.8
		Missing	7	3.4
	Total		204	100.0

Figure 2 Subscription to Water

It is interesting to split the respondents among those who declared previously to take water from the network (question 02.02).



Subscription to Water Network

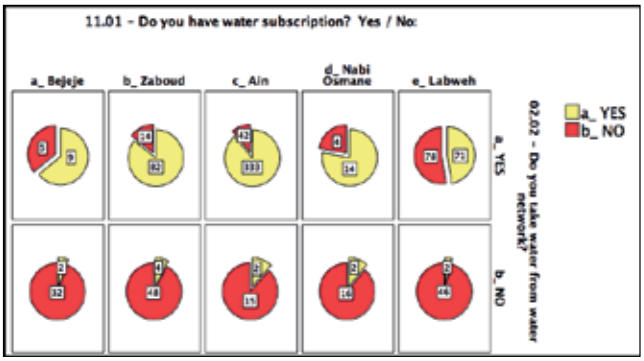
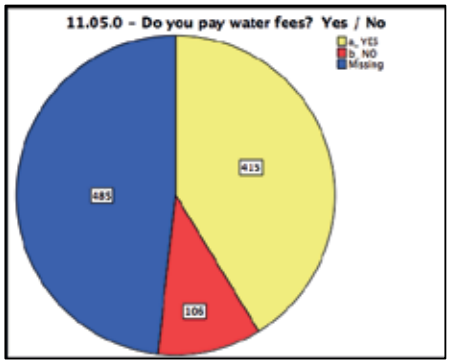


Figure 3 Subscription VS water users chart

It can be noticed that:

- Among those who are **not taking water** very few declare to have a water subscription.
- Among those who **are taking water** from the network there is **a relevant number of people that declare to do not be subscribed.** This is happening especially in Labwe but also in all other Municipalities even if in lower percentages.



Declaration about Payment

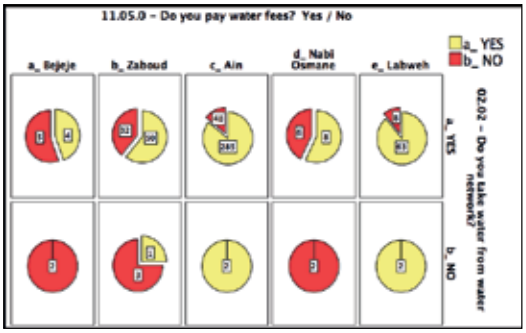
S-11.05.0 - Do you pay water fees?

Those that declared to have a subscription have been asked if they pay fees.

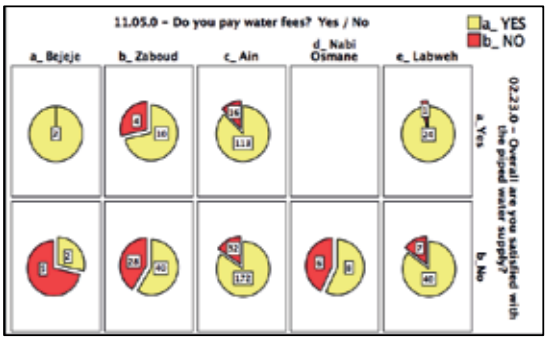
It is normal to expect that some of the interviewees could have declared the "false" to this question by fearing consequences, but in any case it is interesting to note that **20% declared without any shame to "do not pay at all".**

If this answer is analyzed between different categories of respondents it is interesting to see that most of those who are having a subscription and do not pay are in any case among those declaring to take water from the network.

Similar analysis can be done by crossing this question with the one about satisfaction about water network *(question 02.23)*, the results show that **if people are satisfied there is just a slightly higher tendency to pay water fees,** but not much evident.



Payment fees by User



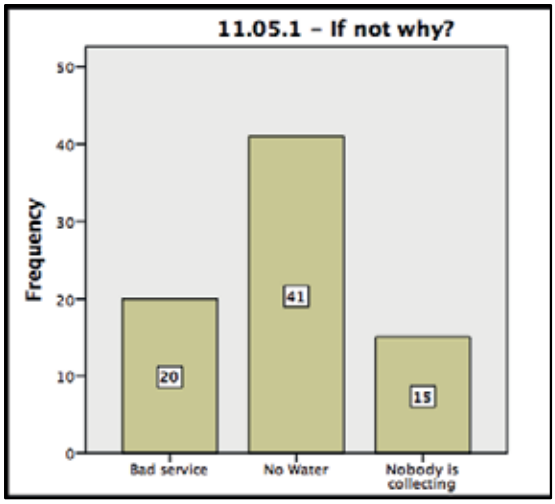
Payment fees by degree of satisfaction

It should be paid particular attention to the answers in Ain, where those who do not pay are in same percentages among those who are satisfied and those who are not satisfied with the network.

Among those who are declaring to do not pay, the reasons are: *(question 11.05.1)*

- **26%** bad service
- **54%** lack of water
- **20%** nobody is collecting

When requested to whom they pay water fees *(question 11.06)*, 86% declared to the Water Employee, but still 13% are mentioning the Municipality (this can also be due to the fact that some of the respondents are not the person in charge in the household for paying fees);60% declare to pay by cash or cheque at the counter; 11% to the landlord and 8% directly to the water employee.



Reason for not paying

S-11.09 - How often per year would you prefer to pay?

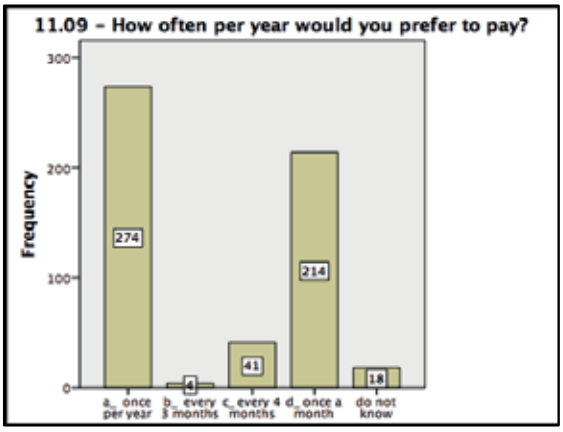
In relation to payment frequency:

- 50% of the people would prefer to pay once per year
- 15% that would prefer every 3-4 months
- 39% every month

These values are not much correlated by the fact that the interviewee was or not already a subscriber.

Almost **93% declare not to have any particular complaint** about the actual billing system *(question 11.10.0).*

When people have complaints, the person they address to is the water employee (67%); 18% claim that there is no one to complain to and 13% still address their complaints to the Municipality *(question 11.11).*



Preferred frequency of Payment

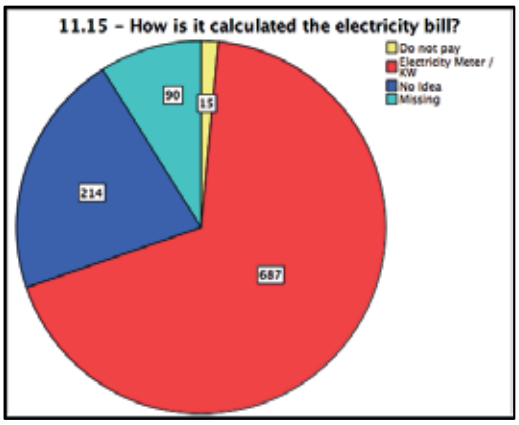
S-11.15 - How is it calculated the electricity bill?

75% of the interviewees confirm to know what is an electricity meter (question 11.15).

Average expense for **electrical grid is 45.000 LBP** per month (question 11.13). Average expense for **private generator electricity is 95.000** per month (question 11.12).

When asked if the total expense for electricity is reasonable (question 11.16.0):

- 59% declared Yes and 90% affirmed that it is because it is related to consumption (question 11.16.1)
- 41% declared No because it is too expensive (85%) or irregular (15%) (question 11.16.2)

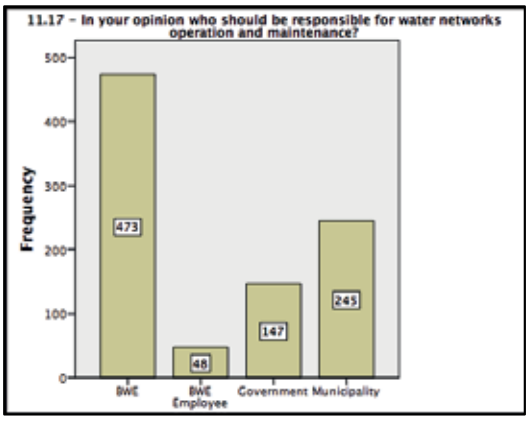


Knowledge about Electric Billing

S-11.17 - In your opinion who should be responsible for water networks operation and maintenance?

Most of the people recognize the role of the Establishment or its employees *(57%)* in operation and maintenance of the water schemes, but **still 27% think that it is a responsibility of the Municipality** *(question 11.17).*

When asked directly what is Bekaa Water Establishment (BWE), mentioning the name of it, only 35% declared to know exactly what they are and that they are the responsible for water *(question 11.28.0-1).*



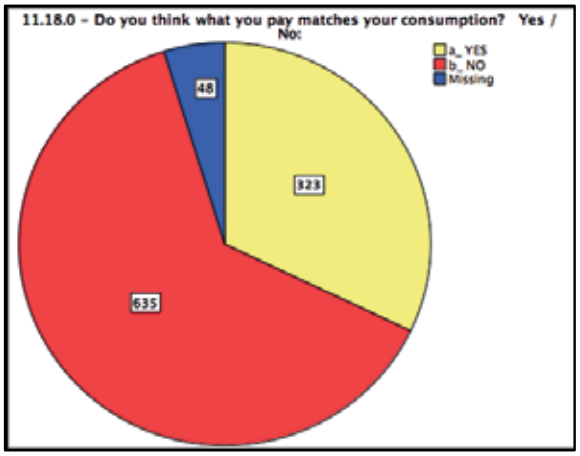
Responsible for Water scheme O&M

Please pay attention that in some of the previous answers often it is mentioned “BWE” as an answer with higher rates than this last question (for example question 11,17 here aside). This error is mainly due to the fact that the interviewers, when reporting an answer mentioning a generic Water Institutions, have been categorizing it already as BWE in the answers even if it was not spelled exactly as Bekaa Water Establishment.

S-11.18.0 - Do you think what you pay matches your consumption?

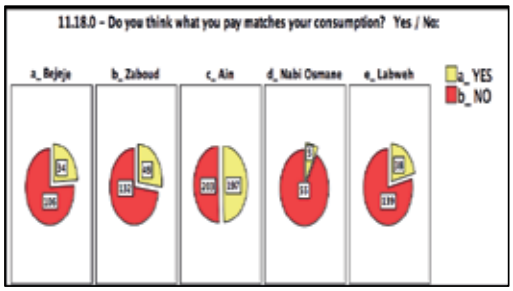
66% of the interviewees think that what they pay is not **correlated** to their real consumption.

Please note that this question has been asked to all the population, not just to those who are actually taking water from the network. This is because, as it will be shown in the following questions, it was **important to know the opinion of everyone about water metering and to involve them in the process of formulating an opinion.**

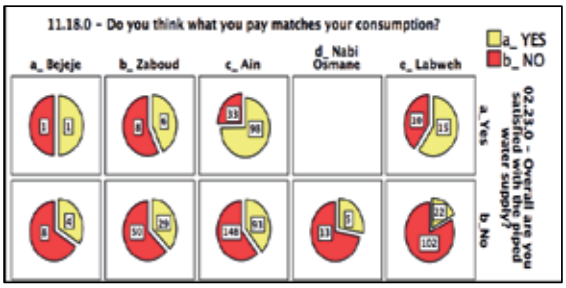


Water Tariff Against Real Consumption

It has been interesting to crosscheck this question with the degree of satisfaction about the water network previously assessed in question 02.23.0. Some correlation can be seen especially in Ain and Labwe, where the network is reaching more population.



Alignment Tariff/Consumption



Alignment Tariff/Consumption by Satisfaction with the service

S-11.18.1-if no how would you suggest to line up consumption with tariff?

Apart 21% who has been replying by "having always access to water", the remaining part of the interviewees have been replying:

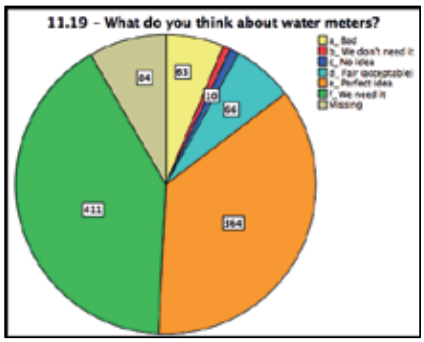
- 66% "we have to pay as much as we consume"
- **13%** mentioned directly **"water meter"**

S-11.19 - What do you think about water meters?

It is important to notice that the word "water meter" was not mentioned at all by the surveyors up to this question. In the following table the answers to this question:

		Frequency	Percent	Valid Percent
Valid	Bad	63	6.3	6.8
	We don't need it	8	.8	.9
	No idea	10	1.0	1.1
	Fair (acceptable)	66	6.6	7.2
	Perfect idea	364	36.2	39.5
	We need it	411	40.9	44.6
	Total	922	91.7	100.0
Missing		84	8.3	
Total		1006	100.0	

Table 3-1 Perception about water meters



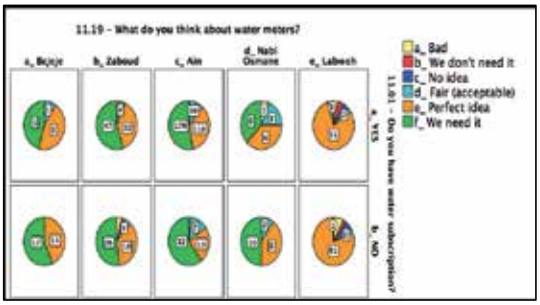
Perception of water meters

The two groups “perfect idea” and “we need it” (orange and green in the chart) have not been merged because they express a slightly different “enthusiasm” about the idea of water meter.In any case, including those who consider “fair” their introduction, **91% of the people are favorable** to the introduction of water meters, **84%** declare to be **enthusiastic**!

Different analyses of the data have been conducted in order to identify if those who are against (around 8%) are part of a specific category of respondents..

Most of them seem to come from one municipality: Labwe.

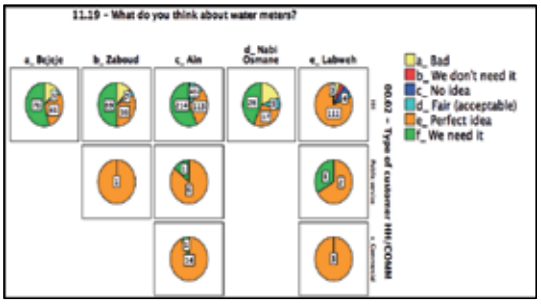
Opinion about water meters Vs Subscription



Opinion about water meters Vs subscription

There is no correlation with having or not a subscription.

There is no correlation between being an household or a commercial activity or a public service (the last two categories often consuming higher quantities of water).



Opinion water meters by category of customer

Considering the importance of the topic, a further question to clarify has been asked:

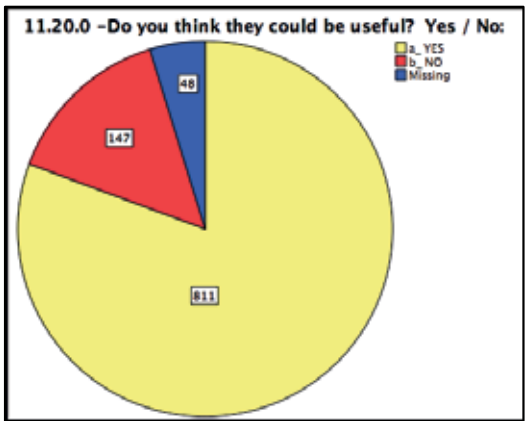
S-11.20.0 Do you think water meters could be useful?

To this more specific question, it is clear that:

• 85% declare YES

• 15% declare NO

The answers do not show any particular correlation with quantities of water used by the household per month.

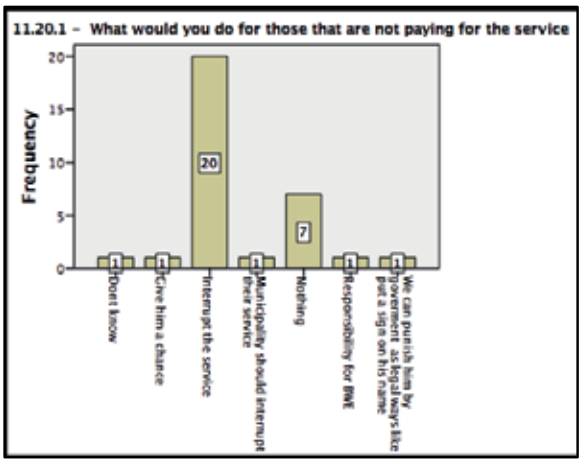


Utility of Water Meters

S-11.20.1 - What would you do for those who are not paying for the service?

A specific set of questions have been asked to know the opinion of the people about the action that should be taken in case people would not pay.

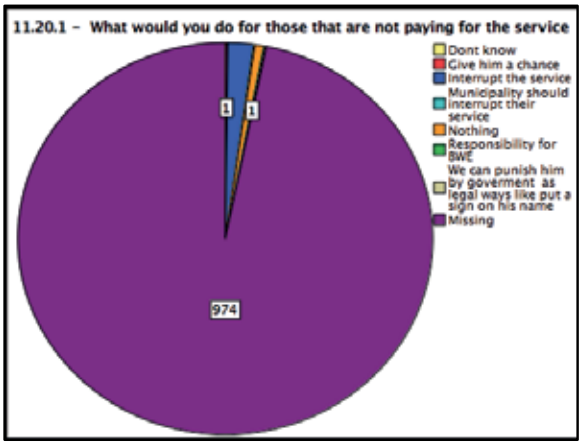
N.B.: Unfortunately, as the question has been inserted at a later stage during the implementation of the survey, and because an error in management of the data, **these questions have been asked just to commercial categories and public services** (that have been interviewed at the end of the survey in the whole area).



Sanction for not payers

From the graph it is possible to see that all the purple color slice of the pie has not been answered because of the mentioned problem. It means that **just a percentage of 3% of the interviewees gave their opinion.** This should be taken into account analyzing the next questions but in any case some important considerations can be done even from such a small sample especially for identifying some points that should be addressed to awareness campaigns.

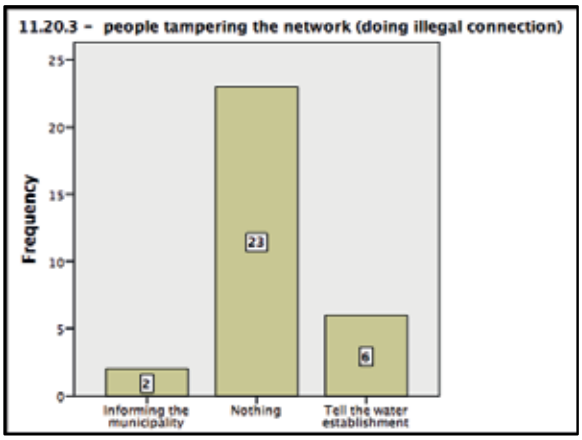
Among the respondents **63 % declared that the service should be stopped** (within 1 month by 50% of the respondents) in case of no payment while an **alarming 22%** declared instead that **"nothing"** should be done (question 11.20.1).



Sanction for not payers (% of respondants)

If asked about **illegal connections** or practices of tampering into the systems, the majority is aware of possible problem in reducing quantities and pressure for the others (question 11.20.4), but when asked what should be done against these practices, the respondents declared:

- 7% inform the Municipality
- 19% inform the Water Establishment
- An alarming **74% said "nothing"** should be done.



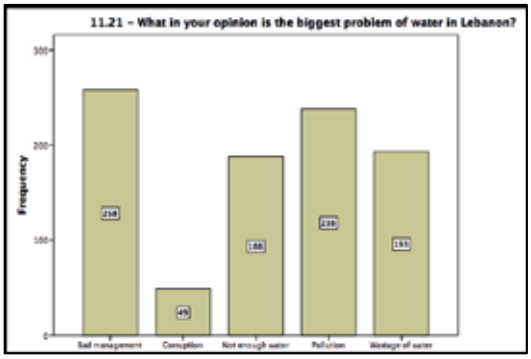
Sanction for illegal Connections

As mentioned above the sample is very small but in any case it is already symptomatic of some bad behaviors and practices present in each community that should be monitored and addressed by proper awareness campaigns and law enforcement by the Authorities.

S-11.21 - What is in your opinion the biggest problem of water in Lebanon?

About general management of water in Lebanon, people have different opinions which are concentrated in few groups, like:

- Bad management (28%)
- Lack of water (20%)
- Pollution (25%)
- Wastage of water (21%)
- Corruption (5%)



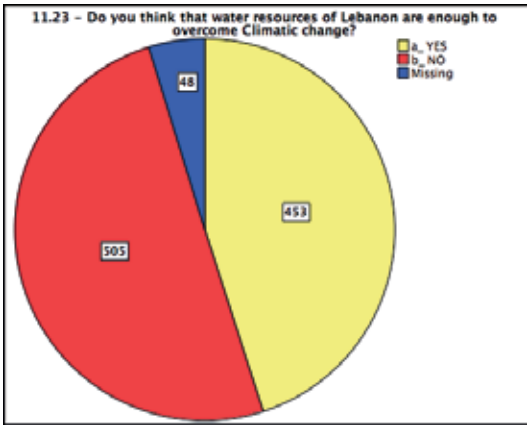
Biggest problem for water in Lebanon

It is interesting to note as an important percentage stresses the problem of wastage of water as one of the main causes.

84% of the interviewees declare that the situation got worst during last year (question 11.22.0) and when asked why:

- Lack of rain (53%)
- Mismanagement (38%)

This perception is important when addressing future awareness campaigns about water scarcity as **a relevant percentage of the people still attribute the problem to causes related to management.**



Perception about Lebanon water resources

When asked if water resources in Lebanon would be enough to overcome climatic change (question 11.23) **more than 50% answered "NO".**

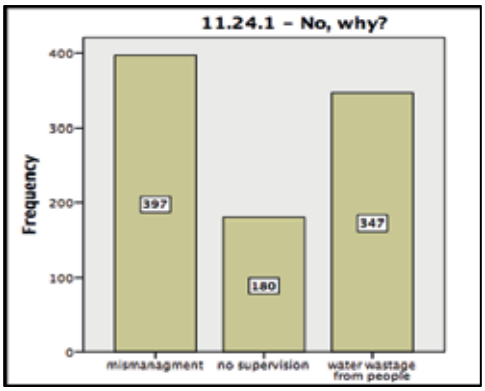
- It should be stressed here that there is the possibility that a good percentage of people do not know exactly what the meaning of "climate change" is, and no previous questions have been made to introduce the subject.
- It is important in any case to record this answer, especially **when addressing awareness campaigns about water scarcity.**

S-11.22.0 - Do you think that water resources in Lebanon are properly used?

97% of the people think that water resources in Lebanon are not properly used (question 11.20.0).

This answer in any case could have been induced by such a formulation of the question, but what is important to stress are the answers given to the following question (11.24.1) where the **reasons of not proper use have been demanded:**

- 43% mention "mismanagement"
- 20% lack of supervision
- 38% attribute the responsibility to the wastage done at household level by the same inhabitants.



Opinion about use of water resources

These values are interesting as a starting point for an awareness campaign about water conservation.

S-11.25.5 - The most important aspects for water service?

N.B.: The question about the most important aspects to be achieved with a public water service, has not been exactly formulated by the interviewers as initially foreseen: it was foreseen that each respondent could choose only one value. What happened is that many of them choose more than one value and this affected the interpretation of the result.

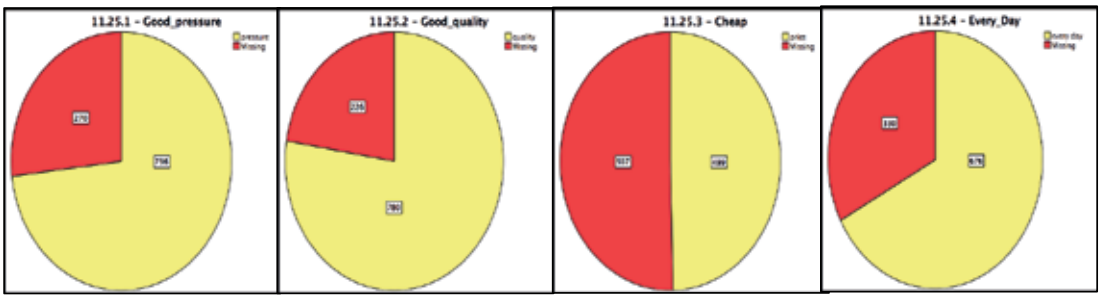


Figure 4 Most important aspects for water services

One important consideration in any case can be done: from the sizes of the pies, it is possible to understand that

- **Quality** (question 11.25.2) is the most rated with **78%** of the cases (the value is different from what obtained with question 2.23.2 where the majority has been rating mainly only pressure and quantity).
- **Pressure** (question 11.25.1) is rated by **73%** of the cases.
- **Daily service that** (question 11.25.4) is mentioned by **67%** of the cases.
- **Price** as **cheap** (question 11.25.3) is mentioned **only by 50%** of the respondents

Even if there is no scientific evidence, it can be stated that **the price is relatively the less important factor** when talking about important characteristics of a public water service.

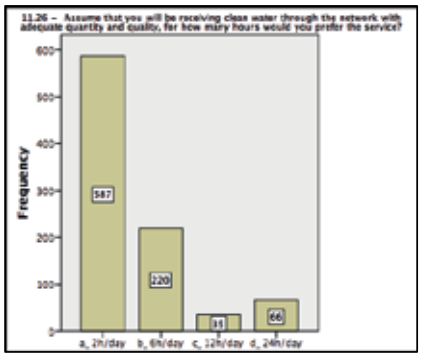
S-11.26 - Assume that you will be receiving clean water through the network with adequate quantity and quality, for how many hours would you prefer the service?

It is astonishing to notice that the **required level is only 2h per day for 65%** of the cases.

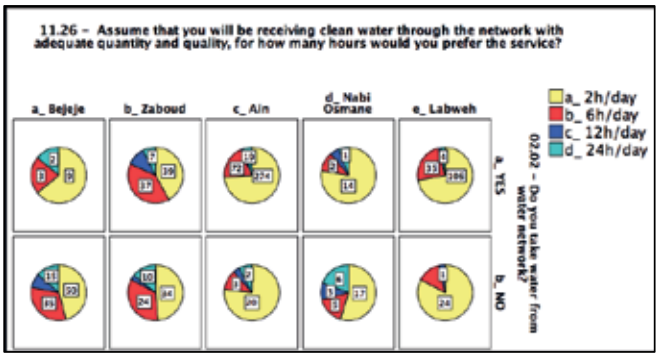
The interviewees have been requested to define their preferred **level of service in terms of hours per day**, considering that all the other previous quality mentioned in the questions above would have been satisfied

		Frequency	Percent	Valid Percent
Valid	**2h/day**	587	58.3	**64.6**
	6h/day	220	21.9	24.2
	12h/day	35	3.5	3.9
	24h/day	66	6.6	7.3
	Total	908	90.3	100.0
Missing		98	9.7	
Total		1006	100.0	

It can be noticed, by crossing this answer with the respondents who are taking water from the network, that these requests are similar between the two categories, but that **the villages which do not have yet a proper water network (Bejjeje and Zabboud) have higher expectations than those which already experienced it.** In these two communities there is a larger number of people expecting water at least 6h per day.



Expected hours of service



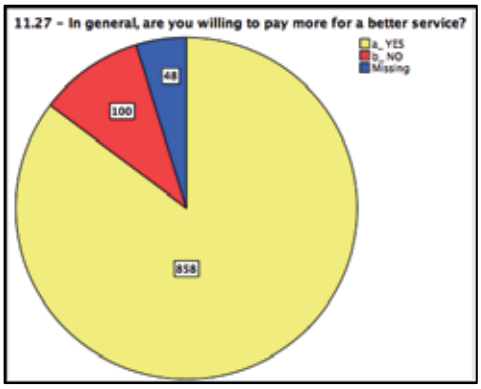
Expected hours of service by Municiplaity

S-11.27 - In general, are you willing to pay more for a better service?

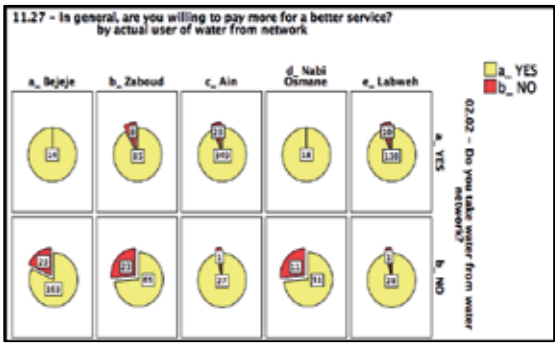
To the generic question are you willing to pay more if the service would be improved, **90% of the people replied positively.**

By crossing this answer with the group that declared to actually use the network it is possible to state that there is an higher percentage of people reluctant to pay more between:

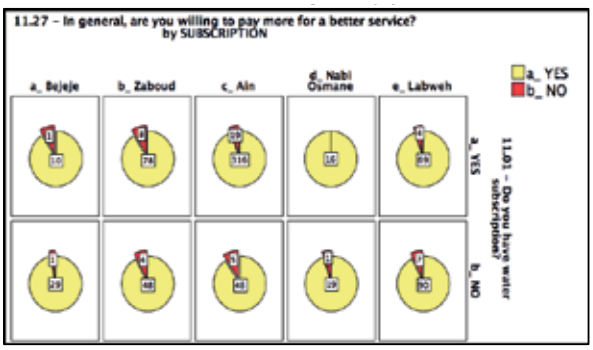
- Those who are not actually taking water from the network
- In the Municipalities where the service has not still been improved recently (Bejjeje, Zaboud and Nabi Osmane)



Willingness to pay more



WTP by Municipality and use of network



WTP by Municipality and subscription

There is no correlation between Willingness to Pay more and being or not already subscribed.

Q.12 Willingness To Pay

- 90% of the interviewees declare to be ready to pay more for a reliable public service, and the assessed average willingness to pay (calculated in relation to the hours of service demanded) is 31.730 LBP/ month.

BIDDING GAME

After having completed the previous chapters and having assessed a "generic" willingness to pay, it has been introduced a particular technique to quantify the willingness to pay defined as "bidding game".

The technique that is mentioned in many manuals in water sector, asks the interviewees to **think about the level of service they have been demanding previously** (question 11.26.1 about hours of service per day) and in relation to that to assess the price they would pay for it.

Instructions provided to the interviewer:

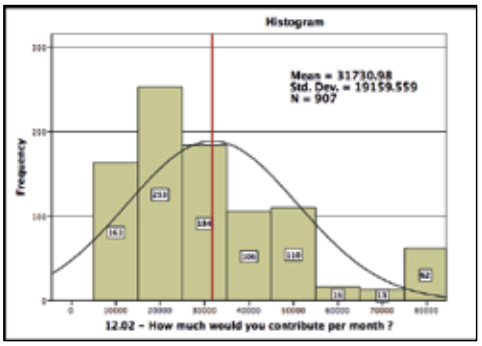
- Please guide the respondent through the bidding game, starting with the highest set price for the required level of service (declared previously in question 11.26.1). When the respondent chooses a price please tick in the box against that bid, and stop the exercise".
- "If the respondent gets up to the end without accepting the lowest rate (20.000 LBP almost corresponding to the actual tariff), ask him if he does not want to pay at all or just to pay even less. If the response is to pay less mark 10.000 LBP per month."

Introduction enunciated by the interviewer:

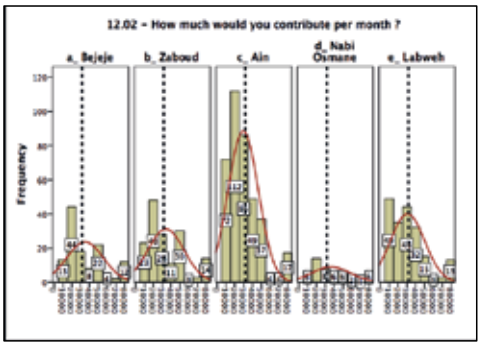
- "Water Establishment should spend a lot of money on electricity, chemicals, pipes, pumps, motors, and other equipment including staff salaries in order to purify the water, store it and transport it to your homes with pipes".
- "Water Establishment such as BWE should be able to cover all operation and maintenance costs with some money left to finance improvements in water supply".
- "In the past BWE has not had enough funds to be able to cover all operation and maintenance costs or even to finance improvements in water supply because not everyone was paying the fees and the costs for the systems are higher than money people are paying with the tariff".
- "This is the main reason why, in case you are connected, water supply to your house may not be reliable, sometimes resulting in serious water shortages".
- "Before BWE carries out any improvements to the water services, it is important to know **how much money** people would be willing to pay for improved service. With this information, BWE can then plans to give people the type of water service that they want and are willing to pay for".
- "Now I am going to ask you some questions to learn whether your household would be willing to pay more money in order to improve the water supply service. It is important that you answer questions, as truthfully as you can so that we can know the amount you would be willing to pay for an improved supply of water to your household".

S-12.02 - For the required level of service, how much would you contribute per month?

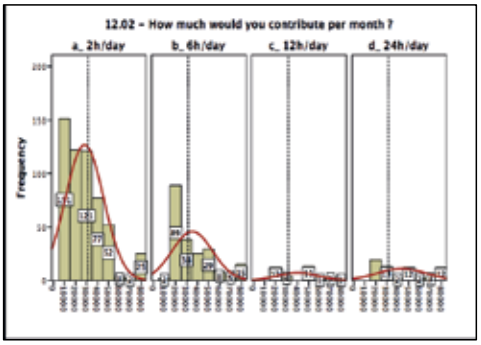
From this exercise the average value obtained is **31.730 LBP per month** (against 18.300 paid with the actual tariff for 1m3 per day).



Average WTP in LBP



WTP by Municipality



WTP by Expected level of service

The average value is:

- Similar for each Municipality but it is interesting to notice that is **slightly higher** for those Municipalities (Bejjeje and Zabboud) that **never had a proper water infrastructure.** This can show probably lower levels of confidence by those who are already experiencing the public service.
- It is lower (as expected) for those requesting only 2h/day service and **is progressively increasing** with the demanded levels of service.

3.2.11 Chapter 4 - Consumption summary and costs results tables

- Average actual consumption in the area is 145 l/capita/day
- Average expenditure for water is 69.300 LBP/month per household
- Where the public service is present and reliable the average costs are much lower
- Private wells, considering costs for operating and perceived quality are not a real competitor to public network in case reliability of the network is achieved

This chapter analyses the results of the aggregated data collected during the exercise done in section 7 of the questionnaire.

The objective of these tables is to present in a synthetic form the data collected and to have the opportunity to make comparison between different categories of citizens/customers and focus on specific scenarios.

It has been possible to aggregate data from more than 987 surveyed citizens spread among the 5 Municipalities:

• 906 households

• 62 commercial activities

• 19 public services

Different analyses have been proposed in the next pages by aggregating different criteria or geographic locations.

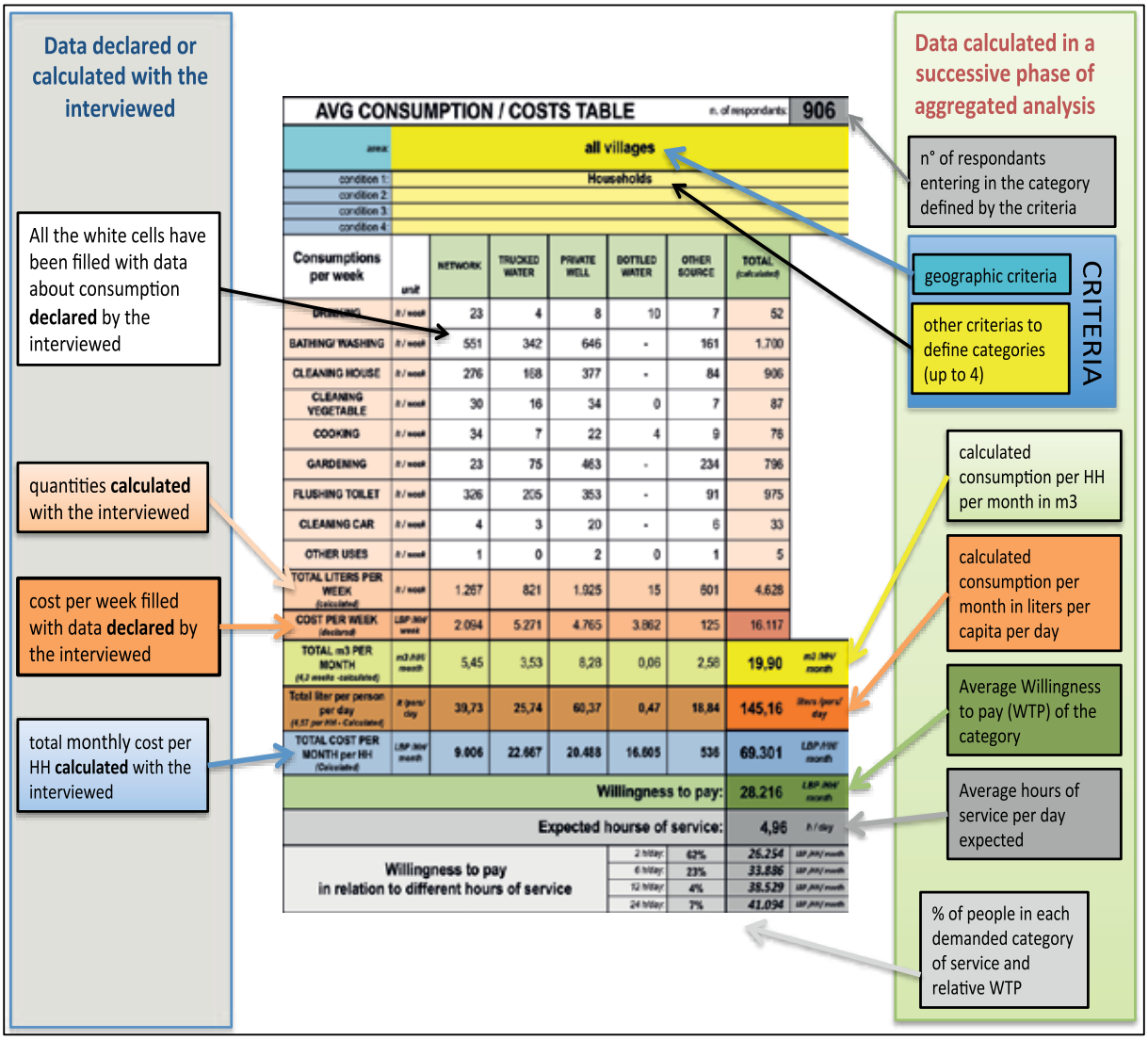
Sometimes the number of cases entering in a certain category of analysis is too little to be relevant. In these cases, it will be highlighted.

A synthetic table is proposed at the beginning of every paragraph to facilitate comparisons, but it is important for understanding more details and particular patterns to refer to the full tables.

A **summary table** is proposed at the end of this chapter to facilitate comparison of different values between different categories.

Please find here below some indications about how to read the tables:

- **On the left side:** the data that have been filled or calculated with the citizen (contributing also to awareness)
- **On the right side:** operation with aggregated data and various additional analysis conducted at a later stage by the author.



Instructions for reading the tables of consumption

3.2.11.1 General Consumptions

	area	cond1	cond2	cond3	cond4	sample	m3/month	l/pers/day	exp/month	*WTP/month*	*avg h/serv*	2h-%	6h-%	12h-%	24h-%	*WTP-2h*	*WTP-6h*	*WTP-12h*	*WTP-24h*
1	all villages	-	-	-	-	987	21,7	158	74.542	28.608	4,95	59%	22%	4%	7%	26.542	33.727	38.857	41.515
2	all villages	Households	-	-	-	**906**	**19,9**	**145**	**69.301**	**28.216**	**4,96**	62%	23%	4%	7%	26.254	33.886	38.529	41.094
3	all villages	Public-Services	-	-	-	19	110,2	na	128.175	53.158	6,00	32%	16%	5%	5%	45.000	30.000	50.000	80.000
4	all villages	Commercial	-	-	-	62	21,3	na	134.688	26.935	4,09	24%	10%	0%	2%	30.000	30.000	-	30.000

Average consumptions per household or commercial units are similar and around **20 m3 per month**, corresponding to approximately **145 liters per capita per day** (HH only).

Expected hours of service in average is **5 h /day** with a related **willingness to pay** attested around **28.000 LBP per month.**

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **987**

area: **all villages**

condition 1:
condition 2:
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	28	12	8	11	13	72	
BATHING/ WASHING	lt / week	511	321	621	-	321	1.774	
CLEANING HOUSE	lt / week	272	188	367	0	107	934	
CLEANING VEGETABLE	lt / week	27	14	31	0	7	79	
COOKING	lt / week	35	9	41	5	12	102	
GARDENING	lt / week	21	70	476	-	241	809	
FLUSHING TOILET	lt / week	330	241	351	-	206	1.128	
CLEANING CAR	lt / week	4	3	60	-	15	82	
OTHER USES	lt / week	1	2	4	0	65	73	
TOTAL LITERS PER WEEK (calculated)	lt / week	1.230	859	1.959	17	987	5.053	
COST PER WEEK (declared)	LBP /HH/ week	2.046	5.554	5.126	4.031	578	17.335	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	5,29	3,70	8,43	0,07	4,25	**21,73**	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	38,56	26,95	61,45	0,53	30,97	**158,47**	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	8.799	23.882	22.040	17.334	2.487	**74.542**	LBP /HH/ month
						Willingness to pay:	**28.608**	LBP /HH/ month
						Expected hourse of service:	**4,95**	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	59%	26.542	LBP /HH/ month
6 h/day:	22%	33.727	LBP /HH/ month
12 h/day:	4%	38.857	LBP /HH/ month
24 h/day:	7%	41.515	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **906**

area: **all villages**

condition 1: **Households**
condition 2:
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	23	4	8	10	7	52	
BATHING/ WASHING	lt / week	551	342	646	-	161	1.700	
CLEANING HOUSE	lt / week	276	168	377	-	84	906	
CLEANING VEGETABLE	lt / week	30	16	34	0	7	87	
COOKING	lt / week	34	7	22	4	9	76	
GARDENING	lt / week	23	75	463	-	234	796	
FLUSHING TOILET	lt / week	326	205	353	-	91	975	
CLEANING CAR	lt / week	4	3	20	-	6	33	
OTHER USES	lt / week	1	0	2	0	1	5	
TOTAL LITERS PER WEEK (calculated)	lt / week	1.267	821	1.925	15	601	4.628	
COST PER WEEK (declared)	LBP /HH/ week	2.094	5.271	4.765	3.862	125	16.117	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	5,45	3,53	8,28	0,06	2,58	**19,90**	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	39,73	25,74	60,37	0,47	18,84	**145,16**	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	9.006	22.667	20.488	16.605	536	**69.301**	LBP /HH/ month
						Willingness to pay:	**28.216**	LBP /HH/ month
						Expected hourse of service:	**4,96**	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	62%	26.254	LBP /HH/ month
6 h/day:	23%	33.886	LBP /HH/ month
12 h/day:	4%	38.529	LBP /HH/ month
24 h/day:	7%	41.094	LBP /HH/ month

3.2.11.2 Commercial And Public Services

	area	cond1	cond2	cond3	cond4	sample	m3/month	l/pers/day	exp/month	WTP/month	avg h/serv	2h-%	6h-%	12h-%	24h-%	WTP-2h	WTP-6h	WTP-12h	WTP-24h
1	all villages	-	-	-	-	987	21,7	158	74.542	28.608	4,95	59%	22%	4%	7%	26.542	33.727	38.857	41.515
2	all villages	Households	-	-	-	**906**	**19,9**	**145**	**69.301**	**28.216**	**4,96**	62%	23%	4%	7%	26.254	33.886	38.529	41.094
3	all villages	Public-Services	-	-	-	19	110,2	na	128.175	53.158	6,00	32%	16%	5%	5%	45.000	30.000	50.000	80.000
4	all villages	Commercial	-	-	-	62	21,3	na	134.688	26.935	4,09	24%	10%	0%	2%	30.000	30.000	-	30.000

Public services have much higher consumptions: up to 110 m3 per month. The average of this category, considering the limited number of sample (19), cannot be generalized out of the study area, and is much depending on the single public institutions present in the area.

As example, the school in Bejjeje, with an high influx of students from neighbouring municipalities, highly influences the results for the whole category.

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **62**

area: **all villages**

condition 1: Commercial
condition 2:
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	16	7	10	22	17	72	
BATHING/ WASHING	lt / week	55	67	440	-	130	691	
CLEANING HOUSE	lt / week	179	262	323	0	150	914	
CLEANING VEGETABLE	lt / week	-	-	-	-	-	-	
COOKING	lt / week	33	30	341	23	30	458	
GARDENING	lt / week	-	11	812	-	65	888	
FLUSHING TOILET	lt / week	153	139	410	-	181	883	
CLEANING CAR	lt / week	0	-	662	-	161	823	
OTHER USES	lt / week	2	25	34	-	161	221	
TOTAL LITERS PER WEEK (calculated)	lt / week	437	541	3.032	45	894	4.950	
COST PER WEEK (declared)	LBP /HH/ week	1.159	3.935	11.970	7.065	7.194	31.323	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	1,88	2,33	13,04	0,20	3,84	21,29	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	na	na	na	na	na	na	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	4.985	16.923	51.471	30.377	30.932	134.688	LBP /HH/ month
Willingness to pay:							26.935	LBP /HH/ month
Expected hourse of service:							4,09	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	24%	30.000	LBP /HH/ month
6 h/day:	10%	30.000	LBP /HH/ month
12 h/day:	0%	-	LBP /HH/ month
24 h/day:	2%	30.000	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **19**

area: **all villages**

condition 1: Public Services
condition 2:
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	334	395	4	12	287	1.031	
BATHING/ WASHING	lt / week	89	168	-	-	8.584	8.842	
CLEANING HOUSE	lt / week	377	876	26	-	1.059	2.339	
CLEANING VEGETABLE	lt / week	-	-	-	-	-	-	
COOKING	lt / week	112	7	-	1	105	225	
GARDENING	lt / week	11	-	-	-	1.158	1.168	
FLUSHING TOILET	lt / week	1.116	2.263	79	-	5.733	9.192	
CLEANING CAR	lt / week	-	-	-	-	-	-	
OTHER USES	lt / week	-	26	-	-	2.800	2.826	
TOTAL LITERS PER WEEK (calculated)	lt / week	2.039	3.736	109	13	19.726	25.623	
COST PER WEEK (declared)	LBP /HH/ week	2.650	24.316	-	2.211	632	29.808	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	8,77	16,06	0,47	0,06	84,82	110,18	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	na	na	na	na	na	na	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	11.396	104.558	-	9.505	2.716	128.175	LBP /HH/ month
Willingness to pay:							53.158	LBP /HH/ month
Expected hourse of service:							6,00	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	32%	45.000	LBP /HH/ month
6 h/day:	16%	30.000	LBP /HH/ month
12 h/day:	5%	50.000	LBP /HH/ month
24 h/day:	5%	80.000	LBP /HH/ month

3.2.11.3 "Network" Vs "Well"

	area	cond1	cond2	cond3	cond4	sample	m3/month	l/pers/day	exp/month	WTP/month	avg h/serv	2h-%	6h-%	12h-%	24h-%	WTP-2h	WTP-6h	WTP-12h	WTP-24h
33	all villages	Households	Network-YES	Well-YES	-	199	24,2	176	78.272	30.553	5,59	59%	28%	3%	10%	27.542	33.571	34.000	39.000
34	all villages	Households	Network-YES	Well-NO	-	413	17,5	128	60.318	27.512	3,72	74%	20%	3%	3%	25.428	32.381	37.692	40.909
35	all villages	Households	Network-NO	Well-YES	-	170	25,4	185	90.143	35.205	7,32	50%	25%	5%	16%	30.471	39.535	47.778	41.786
36	all villages	Households	Network-NO	Well-NO	-	124	13,6	99	56.249	18.511	4,95	48%	23%	6%	4%	21.864	30.357	31.429	46.000

All the categories that have **network connection have lower expenses** in relation to those that are not connected for similar quantities consumed. Just for very low citizens/ customers not connected the price is lower (56.000 LBP) but the average quantity is almost half (99 lpcd).

Those that **have a well present higher consumptions** (around 180 lcpd) than those that are without.

Those with a well have always higher expectations in terms of hour of service from the network than those that are without. This is probably related to the availability of the water from the well that has been recognized as one of its main advantages.

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **199**

area:	all villages
condition 1:	Households
condition 2:	Network YES
condition 3:	Well YES
condition 4:	

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	26	1	12	15	4	57	
BATHING/ WASHING	lt / week	500	31	1.476	-	5	2.012	
CLEANING HOUSE	lt / week	267	14	808	-	10	1.099	
CLEANING VEGETABLE	lt / week	28	3	64	0	1	95	
COOKING	lt / week	36	0	40	6	6	88	
GARDENING	lt / week	15	14	972	-	48	1.049	
FLUSHING TOILET	lt / week	260	27	872	-	12	1.172	
CLEANING CAR	lt / week	3	-	34	-	2	39	
OTHER USES	lt / week	1	-	5	-	-	6	
TOTAL LITERS PER WEEK (calculated)	lt / week	1.135	90	4.285	20	87	5.617	
COST PER WEEK (declared)	LBP /HH/ week	2.301	508	10.741	4.653	-	18.203	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	4,88	0,39	18,42	0,09	0,37	24,15	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	35,60	2,82	134,39	0,63	2,73	176,17	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	9.894	2.182	46.186	20.009	-	78.272	LBP /HH/ month
						Willingness to pay:	30.553	LBP /HH/ month
						Expected hourse of service:	5,59	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	59%	27.542	LBP /HH/ month
6 h/day:	28%	33.571	LBP /HH/ month
12 h/day:	3%	34.000	LBP /HH/ month
24 h/day:	10%	39.000	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **413**

area:	all villages
condition 1:	Households
condition 2:	Network YES
condition 3:	Well NO
condition 4:	

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	37	5	0	7	4	53	
BATHING/ WASHING	lt / week	955	494	15	-	162	1.626	
CLEANING HOUSE	lt / week	464	247	6	-	83	801	
CLEANING VEGETABLE	lt / week	51	21	1	0	6	79	
COOKING	lt / week	56	11	0	3	4	74	
GARDENING	lt / week	39	95	2	-	280	415	
FLUSHING TOILET	lt / week	589	315	7	-	91	1.002	
CLEANING CAR	lt / week	7	3	0	-	2	13	
OTHER USES	lt / week	1	1	0	0	1	3	
TOTAL LITERS PER WEEK (calculated)	lt / week	2.200	1.191	31	10	633	4.065	
COST PER WEEK (declared)	LBP /HH/ week	3.380	7.843	266	2.369	168	14.028	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	9,46	5,12	0,13	0,04	2,72	17,48	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	69,01	37,36	0,97	0,31	19,86	127,51	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	14.535	33.725	1.145	10.188	724	60.318	LBP /HH/ month
						Willingness to pay:	27.512	LBP /HH/ month
						Expected hourse of service:	3,72	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	74%	25.428	LBP /HH/ month
6 h/day:	20%	32.381	LBP /HH/ month
12 h/day:	3%	37.692	LBP /HH/ month
24 h/day:	3%	40.909	LBP /HH/ month

3.2.11.4 "Network" Vs "Truck"

	area	cond1	cond2	cond3	cond4	sample	m3/month	l/pers/day	exp/month	WTP/month	avg h/serv	2h-%	6h-%	12h-%	24h-%	WTP-2h	WTP-6h	WTP-12h	WTP-24h
37	all villages	Households	Network-YES	truck YES	-	190	20,9	153	101.680	30.471	3,89	72%	21%	5%	3%	28.382	33.000	37.778	60.000
38	all villages	Households	Network-YES	Truck-NO	-	422	19,1	139	50.162	27.607	4,52	68%	24%	2%	6%	24.895	32.800	35.556	35.769
39	all villages	Households	Network-NO	truck YES	-	69	20,9	153	132.951	30.870	4,90	59%	30%	0%	7%	26.098	37.143	-	56.000
40	all villages	Households	Network-NO	Truck-NO	-	225	20,3	148	58.336	26.749	6,95	46%	22%	7%	12%	27.282	35.400	40.625	40.000

Whenever water truck is included in the mix of sources, the average monthly cost increases sharply, exceeding always **100.000 LBP/month.**

Also in this case, people who are connected to network spend less than those who are not connected (with similar quantities consumed).

Also in this case it is important to highlight that the expectations in terms of hours of service for those who are not connected are in average higher than those who are connected.

Some additional combinations of cases have been done. It is clear that **those who do not have network spend always more** and those who do not have a network have always higher expectations in terms of hours of service.

AVG CONSUMPTION / COSTS TABLE — n. of respondents: **190**

area:	all villages
condition 1:	Households
condition 2:	Network YES
condition 3:	Truck YES
condition 4:	

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	37	11	0	9	4	61	
BATHING/ WASHING	lt / week	815	1.051	1	-	14	1.881	
CLEANING HOUSE	lt / week	390	534	1	-	4	929	
CLEANING VEGETABLE	lt / week	48	47	0	0	1	97	
COOKING	lt / week	52	22	0	3	2	79	
GARDENING	lt / week	37	221	0	-	386	644	
FLUSHING TOILET	lt / week	461	685	4	-	13	1.163	
CLEANING CAR	lt / week	8	7	-	-	-	15	
OTHER USES	lt / week	1	1	0	0	-	2	
TOTAL LITERS PER WEEK (calculated)	lt / week	1.848	2.579	7	13	424	4.871	
COST PER WEEK (declared)	LBP /HH/ week	3.337	16.949	239	3.055	66	23.646	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	7,95	11,09	0,03	0,05	1,83	20,95	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	57,97	80,89	0,21	0,39	13,31	152,78	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	14.351	72.879	1.030	13.138	283	101.680	LBP /HH/ month
						Willingness to pay:	30.471	LBP /HH/ month
						Expected hourse of service:	3,89	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	72%	28.382	LBP /HH/ month
6 h/day:	21%	33.000	LBP /HH/ month
12 h/day:	5%	37.778	LBP /HH/ month
24 h/day:	3%	60.000	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE — n. of respondents: **422**

area:	all villages
condition 1:	Households
condition 2:	Network YES
condition 3:	truck NO
condition 4:	

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	32	1	6	10	4	52	
BATHING/ WASHING	lt / week	804	25	710	-	155	1.693	
CLEANING HOUSE	lt / week	404	8	387	-	84	884	
CLEANING VEGETABLE	lt / week	41	1	31	0	6	79	
COOKING	lt / week	49	0	19	4	5	78	
GARDENING	lt / week	28	-	460	-	123	611	
FLUSHING TOILET	lt / week	492	12	416	-	89	1.009	
CLEANING CAR	lt / week	5	0	16	-	3	24	
OTHER USES	lt / week	1	0	3	-	1	5	
TOTAL LITERS PER WEEK (calculated)	lt / week	1.857	47	2.048	14	470	4.434	
COST PER WEEK (declared)	LBP /HH/ week	2.891	284	5.218	3.137	135	11.666	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	7,98	0,20	8,80	0,06	2,02	19,07	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	58,23	1,47	64,22	0,42	14,73	139,08	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	12.430	1.223	22.437	13.491	582	50.162	LBP /HH/ month
						Willingness to pay:	27.607	LBP /HH/ month
						Expected hourse of service:	4,52	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	68%	24.895	LBP /HH/ month
6 h/day:	24%	32.800	LBP /HH/ month
12 h/day:	2%	35.556	LBP /HH/ month
24 h/day:	6%	35.769	LBP /HH/ month

3.2.11.5 "Satisfied Of Network" Vs "Unsatisfied Of Network"

	area	cond1	cond2	cond3	cond4	sample	m3/month	l/pers/day	exp/month	*WTP/month*	*avg h/serv*	2h-%	6h-%	12h-%	24h-%	*WTP-2h*	*WTP-6h*	*WTP-12h*	*WTP-24h*
41	all villages	Households	Satisfied-YES	-	-	162	**16,5**	**120**	**42.321**	**28.344**	**3,63**	77%	18%	2%	3%	25.200	36.897	45.000	44.000
42	all villages	Households	Satisfied-NO	-	-	450	**20,8**	**152**	**74.737**	**28.556**	**4,58**	66%	25%	3%	6%	26.364	31.802	34.286	38.846

Those satisfied with the network are the category in general spending much less than the average: **42.000 LBP per month** and much less than the unsatisfied that probably have to recur to more informal supplies especially in terms of bottled water and water trucking.

The quantity of water consumed by those who are satisfied is lower than those who are not satisfied, this means probably that when the water from network is more reliable there is an auto-limitation given by the available quantity provided by the network, and more attention is paid to avoid to recur to informal water supplies.

Those who are not satisfied are expecting higher levels of service but the **willingness to pay remains the same** for the two categories.

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **162**

area:	all villages
condition 1:	Households
condition 2:	Satisfied with network YES
condition 3:	
condition 4:	

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	47	1	1	3	0	52	
BATHING/ WASHING	lt / week	1.297	77	191	-	25	1.591	
CLEANING HOUSE	lt / week	617	36	139	-	15	806	
CLEANING VEGETABLE	lt / week	66	4	6	-	2	77	
COOKING	lt / week	75	3	4	1	0	83	
GARDENING	lt / week	43	20	110	-	49	223	
FLUSHING TOILET	lt / week	791	60	116	-	9	975	
CLEANING CAR	lt / week	8	-	17	-	-	25	
OTHER USES	lt / week	1	-	2	-	-	4	
TOTAL LITERS PER WEEK (calculated)	lt / week	2.945	202	585	5	101	3.838	
COST PER WEEK (declared)	LBP /HH/ week	3.948	1.274	3.020	1.503	97	9.842	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	12,66	0,87	2,52	0,02	0,43	**16,50**	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	**92,37**	**6,34**	**18,36**	**0,15**	**3,16**	**120,37**	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	**16.979**	**5.478**	**12.986**	**6.463**	**415**	**42.321**	LBP /HH/ month
						Willingness to pay:	**28.344**	LBP /HH/ month
						Expected hourse of service:	**3,63**	h / day

Willingness to pay in relation to different hours of service				
	2 h/day:	77%	*25.200*	LBP /HH/ month
	6 h/day:	18%	*36.897*	LBP /HH/ month
	12 h/day:	2%	*45.000*	LBP /HH/ month
	24 h/day:	3%	*44.000*	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **450**

area:	all villages
condition 1:	Households
condition 2:	Satisfied with network NO
condition 3:	
condition 4:	

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	29	5	5	12	5	55	
BATHING/ WASHING	lt / week	631	439	597	-	142	1.809	
CLEANING HOUSE	lt / week	322	220	313	-	76	931	
CLEANING VEGETABLE	lt / week	35	19	27	0	5	87	
COOKING	lt / week	41	9	17	4	6	76	
GARDENING	lt / week	27	86	392	-	260	765	
FLUSHING TOILET	lt / week	371	279	350	-	86	1.086	
CLEANING CAR	lt / week	5	3	9	-	3	20	
OTHER USES	lt / week	1	1	2	0	1	4	
TOTAL LITERS PER WEEK (calculated)	lt / week	1.461	1.060	1.712	16	583	4.834	
COST PER WEEK (declared)	LBP /HH/ week	2.698	6.964	3.907	3.691	120	17.381	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	6,28	4,56	7,36	0,07	2,51	**20,78**	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	**45,83**	**33,26**	**53,71**	**0,51**	**18,30**	**151,60**	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	**11.603**	**29.946**	**16.801**	**15.872**	**516**	**74.737**	LBP /HH/ month
						Willingness to pay:	**28.556**	LBP /HH/ month
						Expected hourse of service:	**4,58**	h / day

Willingness to pay in relation to different hours of service				
	2 h/day:	66%	*26.364*	LBP /HH/ month
	6 h/day:	25%	*31.802*	LBP /HH/ month
	12 h/day:	3%	*34.286*	LBP /HH/ month
	24 h/day:	6%	*38.846*	LBP /HH/ month

3.2.11.6 "In Favor Of Water-Meters" Vs "Against Water Meters"

	area	cond1	cond2	cond3	cond4	sample	m3/month	l/pers/day	exp/month	WTP/month	avg h/serv	2h-%	6h-%	12h-%	24h-%	WTP-2h	WTP-6h	WTP-12h	WTP-24h
43	all villages	Households	Meters-YES	-	-	775	20,2	147	72.186	30.386	4,86	65%	24%	4%	7%	26.871	34.595	37.419	45.660
44	all villages	Households	Meters-NO	-	-	131	18,1	132	52.232	16.735	5,72	47%	20%	2%	8%	21.148	28.846	50.000	19.091

Those households that are against water meters are usually those that are **consuming less,** that have **lower expenditures** and have the **lowest willingness to pay (16.700 LBP).**

It is very interesting that households that are fearing more the introduction of water meters are those that could save money with the introduction of water meters (because of their low consumption).

An important awareness campaign should be conducted to reassure this category of people in case of introduction of water meters.

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **775**

area:	all villages
condition 1:	Households
condition 2:	Meters useful YES
condition 3:	
condition 4:	

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	23	4	9	11	8	54	
BATHING/ WASHING	lt / week	532	355	681	-	153	1.720	
CLEANING HOUSE	lt / week	274	179	394	-	85	932	
CLEANING VEGETABLE	lt / week	28	15	37	0	7	88	
COOKING	lt / week	35	8	24	4	8	80	
GARDENING	lt / week	24	76	476	-	217	793	
FLUSHING TOILET	lt / week	325	211	372	-	88	997	
CLEANING CAR	lt / week	3	3	20	-	6	32	
OTHER USES	lt / week	1	1	2	0	1	4	
TOTAL LITERS PER WEEK (calculated)	lt / week	1.245	851	2.016	15	573	4.700	
COST PER WEEK (declared)	LBP /HH/ week	2.167	5.477	5.228	3.809	106	16.788	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	5,35	3,66	8,67	0,07	2,46	20,21	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	39,05	26,70	63,21	0,49	17,97	147,42	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	9.318	23.552	22.480	16.380	456	72.186	LBP /HH/ month
Willingness to pay:							30.386	LBP /HH/ month
Expected hourse of service:							4,86	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	65%	26.871	LBP /HH/ month
6 h/day:	24%	34.595	LBP /HH/ month
12 h/day:	4%	37.419	LBP /HH/ month
24 h/day:	7%	45.660	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **131**

area:	all villages
condition 1:	Households
condition 2:	Meters useful NO
condition 3:	
condition 4:	

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	22	3	4	8	4	42	
BATHING/ WASHING	lt / week	664	266	440	-	209	1.578	
CLEANING HOUSE	lt / week	287	106	275	-	81	749	
CLEANING VEGETABLE	lt / week	37	18	17	0	8	81	
COOKING	lt / week	25	4	9	3	9	51	
GARDENING	lt / week	18	70	387	-	334	809	
FLUSHING TOILET	lt / week	330	171	235	-	111	847	
CLEANING CAR	lt / week	10	2	21	-	4	36	
OTHER USES	lt / week	1	-	2	-	5	8	
TOTAL LITERS PER WEEK (calculated)	lt / week	1.395	640	1.388	12	766	4.201	
COST PER WEEK (declared)	LBP /HH/ week	1.664	4.052	2.025	4.172	234	12.147	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	6,00	2,75	5,97	0,05	3,30	18,06	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	43,74	20,07	43,54	0,37	24,04	131,76	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	7.156	17.426	8.707	17.939	1.006	52.232	LBP /HH/ month
Willingness to pay:							16.735	LBP /HH/ month
Expected hourse of service:							5,72	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	47%	21.148	LBP /HH/ month
6 h/day:	20%	28.846	LBP /HH/ month
12 h/day:	2%	50.000	LBP /HH/ month
24 h/day:	8%	19.091	LBP /HH/ month

3.2.11.7 Different Levels Of Service Expected

	area	cond1	cond2	cond3	cond4	sample	m3/month	l/pers/day	exp/month	WTP/month	avg h/serv	2h-%	6h-%	12h-%	24h-%	WTP-2h	WTP-6h	WTP-12h	WTP-24h
45	All Villages	Households	service-2h-per-day	-	-	563	19,1	139	64.055	26.254	2,00	100%	0%	0%	0%	26.254	-	-	-
46	All Villages	Households	service-6h-per-day	-	-	210	22,0	160	78.484	33.886	6,00	0%	100%	0%	0%	-	33.886	-	-
47	All Villages	Households	service-12h-per-day	-	-	33	23,5	172	68.767	38.529	12,00	0%	0%	100%	0%	-	-	38.529	-
48	All Villages	Households	service-24h-per-day	-	-	64	28,1	205	114.097	41.094	24,00	0%	0%	0%	100%	-	-	-	41.094

There is **direct correlation** between **hours of service demanded and actual consumption, actual expenditure and willingness to pay.** (A non-direct correlation is found only in the actual expenditure between the categories of 6-12h expectation, but it should be stressed that in 12h category there is just a small number of cases).

We can state that those that are actually able to spend more, and at the same time are consuming more, expect higher services and are able to afford them with an higher willingness to pay.

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **563**

area:	All Villages
condition 1:	Households
condition 2:	service 2h per day
condition 3:	
condition 4:	

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	25	5	7	9	7	53	
BATHING/ WASHING	lt / week	622	370	581	-	137	1.710	
CLEANING HOUSE	lt / week	313	178	327	-	81	899	
CLEANING VEGETABLE	lt / week	34	16	29	0	5	84	
COOKING	lt / week	37	8	20	4	7	77	
GARDENING	lt / week	21	57	331	-	197	606	
FLUSHING TOILET	lt / week	369	221	318	-	74	981	
CLEANING CAR	lt / week	4	3	13	-	4	24	
OTHER USES	lt / week	1	1	2	0	1	5	
TOTAL LITERS PER WEEK (calculated)	lt / week	1.427	857	1.628	14	513	4.438	
COST PER WEEK (declared)	LBP /HH/ week	2.386	5.829	2.908	3.661	112	14.896	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	6,13	3,69	7,00	0,06	2,20	19,08	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	44,75	26,89	51,06	0,43	16,08	139,20	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	10.260	25.065	12.506	15.743	480	64.055	LBP /HH/ month
						Willingness to pay:	26.254	LBP /HH/ month
						Expected hourse of service:	2,00	h / day

Willingness to pay in relation to different hours of service				
	2 h/day:	100%	26.254	LBP /HH/ month
	6 h/day:	0%	-	LBP /HH/ month
	12 h/day:	0%	-	LBP /HH/ month
	24 h/day:	0%	-	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **210**

area:	All Villages
condition 1:	Households
condition 2:	service 6h per day
condition 3:	
condition 4:	

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	22	3	8	14	9	57	
BATHING/ WASHING	lt / week	535	344	760	-	229	1.867	
CLEANING HOUSE	lt / week	241	173	401	-	89	905	
CLEANING VEGETABLE	lt / week	26	19	36	0	11	92	
COOKING	lt / week	34	8	18	6	13	78	
GARDENING	lt / week	35	120	540	-	330	1.024	
FLUSHING TOILET	lt / week	297	201	418	-	135	1.051	
CLEANING CAR	lt / week	3	2	18	-	12	36	
OTHER USES	lt / week	0	0	2	-	0	4	
TOTAL LITERS PER WEEK (calculated)	lt / week	1.193	871	2.203	20	828	5.115	
COST PER WEEK (declared)	LBP /HH/ week	1.896	5.169	6.878	4.142	167	18.252	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	5,13	3,74	9,47	0,08	3,56	21,99	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	37,43	27,31	69,10	0,62	25,96	160,42	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	8.153	22.227	29.575	17.812	717	78.484	LBP /HH/ month
						Willingness to pay:	33.886	LBP /HH/ month
						Expected hourse of service:	6,00	h / day

Willingness to pay in relation to different hours of service				
	2 h/day:	0%	-	LBP /HH/ month
	6 h/day:	100%	33.886	LBP /HH/ month
	12 h/day:	0%	-	LBP /HH/ month
	24 h/day:	0%	-	LBP /HH/ month

3.2.11.8 "Bottled Water Yes" Vs "Bottled Water No"

	area	cond1	cond2	cond3	cond4	sample	m3/month	l/pers/day	exp/month	*WTP/month*	*avg h/serv*	2h-%	6h-%	12h-%	24h-%	*WTP-2h*	*WTP-6h*	*WTP-12h*	*WTP-24h*
57	All Villages	Households	Bottled water YES	-	-	233	**20,8**	**152**	**128.895**	**35.106**	**5,24**	61%	25%	6%	7%	31.888	42.241	30.667	44.706
58	All Villages	Households	Bottled water NO	-	-	673	**19,6**	**143**	**48.669**	**25.870**	**4,86**	63%	23%	3%	7%	24.350	30.719	44.737	39.787

Those that buy bottled water are **spending on average much more (129.000 LBP)** than those that are not relying on bottled water that are spending less than a half in comparison for similar total quantities of water consumed.

The people who are **buying bottled water declare a much higher willingness to pay** than those who are not consuming bottled water.

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **233**

area:	**All Villages**
condition 1:	**Households**
condition 2:	**Bottled water YES**
condition 3:	
condition 4:	

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	6	1	2	38	1	48	
BATHING/ WASHING	lt / week	340	420	799	-	194	1.753	
CLEANING HOUSE	lt / week	178	227	447	-	109	960	
CLEANING VEGETABLE	lt / week	20	19	39	1	10	89	
COOKING	lt / week	19	6	14	17	8	64	
GARDENING	lt / week	18	87	454	-	312	872	
FLUSHING TOILET	lt / week	186	262	451	-	100	1.000	
CLEANING CAR	lt / week	2	4	31	-	6	44	
OTHER USES	lt / week	0	0	3	-	3	7	
TOTAL LITERS PER WEEK (calculated)	lt / week	770	1.027	2.240	56	744	4.837	
COST PER WEEK (declared)	LBP /HH/ week	1.601	7.015	6.335	14.908	116	29.976	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	3,31	4,41	9,63	0,24	3,20	**20,80**	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	**24,15**	**32,20**	**70,24**	**1,76**	**23,34**	**151,69**	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	**6.884**	**30.165**	**27.242**	**64.106**	**498**	**128.895**	LBP /HH/ month
Willingness to pay:							**35.106**	LBP /HH/ month
Expected hourse of service:							**5,24**	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	61%	*31.888*	LBP /HH/ month
6 h/day:	25%	*42.241*	LBP /HH/ month
12 h/day:	6%	*30.667*	LBP /HH/ month
24 h/day:	7%	*44.706*	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **673**

area:	**All Villages**
condition 1:	**Households**
condition 2:	**Bottled water NO**
condition 3:	
condition 4:	

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	29	5	10	0	9	53	
BATHING/ WASHING	lt / week	624	315	594	-	149	1.682	
CLEANING HOUSE	lt / week	310	148	352	-	76	887	
CLEANING VEGETABLE	lt / week	33	14	32	0	6	86	
COOKING	lt / week	39	8	24	0	9	80	
GARDENING	lt / week	24	71	466	-	207	769	
FLUSHING TOILET	lt / week	375	185	318	-	88	967	
CLEANING CAR	lt / week	4	2	17	-	6	29	
OTHER USES	lt / week	1	1	2	0	1	4	
TOTAL LITERS PER WEEK (calculated)	lt / week	1.439	749	1.816	1	551	4.556	
COST PER WEEK (declared)	LBP /HH/ week	2.265	4.668	4.221	37	128	11.318	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	6,19	3,22	7,81	0,00	2,37	**19,59**	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	**45,13**	**23,51**	**56,95**	**0,02**	**17,29**	**142,90**	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	**9.740**	**20.071**	**18.150**	**160**	**548**	**48.669**	LBP /HH/ month
Willingness to pay:							**25.870**	LBP /HH/ month
Expected hourse of service:							**4,86**	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	63%	*24.350*	LBP /HH/ month
6 h/day:	23%	*30.719*	LBP /HH/ month
12 h/day:	3%	*44.737*	LBP /HH/ month
24 h/day:	7%	*39.787*	LBP /HH/ month

3.2.11.9 "Household Network Yes" Vs "Network No"

	area	cond1	cond2	cond3	cond4	sample	m3/month	l/pers/day	exp/month	WTP/month	avg h/serv	2h-%	6h-%	12h-%	24h-%	WTP-2h	WTP-6h	WTP-12h	WTP-24h
29	all villages	Households	Network-YES	-	-	612	19,7	143	66.156	28.499	4,33	69%	23%	3%	5%	26.019	32.857	36.667	39.677
30	all villages	Households	Network-NO	-	-	294	20,4	149	75.848	27.660	6,43	49%	24%	5%	11%	26.944	35.915	40.625	42.424

As already highlighted, the **households that are taking water from the networks** are in average **spending less** (more than 10%) than those that are not.

Quantity is higher usually for those that are not connected, probably because they already made investments (like wells) in developing additional sources of water.

Expectations in hours of service are higher for those that are not yet connected.

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **612**

area: **all villages**
condition 1: Households
condition 2: Network YES
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	34	4	4	9	4	55	
BATHING/ WASHING	lt / week	807	343	490	-	111	1.751	
CLEANING HOUSE	lt / week	400	171	267	-	60	898	
CLEANING VEGETABLE	lt / week	43	15	21	0	4	84	
COOKING	lt / week	50	7	13	4	4	78	
GARDENING	lt / week	31	69	317	-	205	621	
FLUSHING TOILET	lt / week	482	221	288	-	65	1.057	
CLEANING CAR	lt / week	6	2	11	-	2	21	
OTHER USES	lt / week	1	0	2	0	1	4	
TOTAL LITERS PER WEEK (calculated)	lt / week	1.854	833	1.414	13	456	4.570	
COST PER WEEK (declared)	LBP /HH/ week	3.029	5.458	3.672	3.112	114	15.385	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	7,97	3,58	6,08	0,06	1,96	19,65	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	58,15	26,13	44,35	0,41	14,29	143,33	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	13.026	23.469	15.791	13.381	489	66.156	LBP /HH/ month
Willingness to pay:							28.499	LBP /HH/ month
Expected hourse of service:							4,33	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	69%	26.019	LBP /HH/ month
6 h/day:	23%	32.857	LBP /HH/ month
12 h/day:	3%	36.667	LBP /HH/ month
24 h/day:	5%	39.677	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **294**

area: **all villages**
condition 1: Households
condition 2: Network NO
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	-	4	17	12	14	47	
BATHING/ WASHING	lt / week	17	339	973	-	265	1.593	
CLEANING HOUSE	lt / week	19	162	605	-	136	921	
CLEANING VEGETABLE	lt / week	1	17	59	1	13	91	
COOKING	lt / week	1	7	39	6	17	70	
GARDENING	lt / week	6	90	767	-	296	1.159	
FLUSHING TOILET	lt / week	2	172	486	-	145	805	
CLEANING CAR	lt / week	-	4	39	-	13	57	
OTHER USES	lt / week	-	1	2	-	3	6	
TOTAL LITERS PER WEEK (calculated)	lt / week	45	795	2.988	19	903	4.749	
COST PER WEEK (declared)	LBP /HH/ week	148	4.883	7.039	5.422	147	17.639	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	0,19	3,42	12,85	0,08	3,88	20,42	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	1,40	24,94	93,72	0,58	28,32	148,96	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	636	20.996	30.266	23.316	633	75.848	LBP /HH/ month
Willingness to pay:							27.660	LBP /HH/ month
Expected hourse of service:							6,43	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	49%	26.944	LBP /HH/ month
6 h/day:	24%	35.915	LBP /HH/ month
12 h/day:	5%	40.625	LBP /HH/ month
24 h/day:	11%	42.424	LBP /HH/ month

3.2.11.10 "Commercial Network Yes" Vs "Commercial Network No"

	area	cond1	cond2	cond3	cond4	sample	m3/month	l/pers/day	exp/month	*WTP/month*	*avg h/serv*	2h-%	6h-%	12h-%	24h-%	*WTP-2h*	*WTP-6h*	*WTP-12h*	*WTP-24h*
57	All Villages	Households	Bottled water YES	-	-	233	20,8	152	128.895	35.106	5,24	61%	25%	6%	7%	31.888	42.241	30.667	44.706
58	All Villages	Households	Bottled water NO	-	-	673	19,6	143	48.669	25.870	4,86	63%	23%	3%	7%	24.350	30.719	44.737	39.787

Similar considerations can be done for commercial activities in terms of costs: those **connected to network spends on average at least 10% less** than those that are not connected.

It is interesting to highlight that the commercial activities that are not **connected are using much higher quantities** than those that are connected. Here too, they invested in more independent strategies to overcome lack of public services.

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **233**

area: **All Villages**
condition 1: **Households**
condition 2: **Bottled water YES**
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	6	1	2	38	1	48	
BATHING/ WASHING	lt / week	340	420	799	-	194	1.753	
CLEANING HOUSE	lt / week	178	227	447	-	109	960	
CLEANING VEGETABLE	lt / week	20	19	39	1	10	89	
COOKING	lt / week	19	6	14	17	8	64	
GARDENING	lt / week	18	87	454	-	312	872	
FLUSHING TOILET	lt / week	186	262	451	-	100	1.000	
CLEANING CAR	lt / week	2	4	31	-	6	44	
OTHER USES	lt / week	0	0	3	-	3	7	
TOTAL LITERS PER WEEK (calculated)	lt / week	770	1.027	2.240	56	744	4.837	
COST PER WEEK (declared)	LBP /HH/ week	1.601	7.015	6.335	14.908	116	29.976	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	3,31	4,41	9,63	0,24	3,20	20,80	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	24,15	32,20	70,24	1,76	23,34	151,69	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	6.884	30.165	27.242	64.106	498	128.895	LBP /HH/ month
Willingness to pay:							35.106	LBP /HH/ month
Expected hourse of service:							5,24	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	61%	31.888	LBP /HH/ month
6 h/day:	25%	42.241	LBP /HH/ month
12 h/day:	6%	30.667	LBP /HH/ month
24 h/day:	7%	44.706	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE — n. of respondants: **673**

area: **All Villages**
condition 1: **Households**
condition 2: **Bottled water NO**
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	29	5	10	0	9	53	
BATHING/ WASHING	lt / week	624	315	594	-	149	1.682	
CLEANING HOUSE	lt / week	310	148	352	-	76	887	
CLEANING VEGETABLE	lt / week	33	14	32	0	6	86	
COOKING	lt / week	39	8	24	0	9	80	
GARDENING	lt / week	24	71	466	-	207	769	
FLUSHING TOILET	lt / week	375	185	318	-	88	967	
CLEANING CAR	lt / week	4	2	17	-	6	29	
OTHER USES	lt / week	1	1	2	0	1	4	
TOTAL LITERS PER WEEK (calculated)	lt / week	1.439	749	1.816	1	551	4.556	
COST PER WEEK (declared)	LBP /HH/ week	2.265	4.668	4.221	37	128	11.318	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	6,19	3,22	7,81	0,00	2,37	19,59	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	45,13	23,51	56,95	0,02	17,29	142,90	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	9.740	20.071	18.150	160	548	48.669	LBP /HH/ month
Willingness to pay:							25.870	LBP /HH/ month
Expected hourse of service:							4,86	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	63%	24.350	LBP /HH/ month
6 h/day:	23%	30.719	LBP /HH/ month
12 h/day:	3%	44.737	LBP /HH/ month
24 h/day:	7%	39.787	LBP /HH/ month

3.2.11.11 Resume Table For All Cases

	area	cond1	cond2	cond3	cond4	sample	m3/month	l/pers/day	exp/month	WTP/month	avg h/serv	2h-%	6h-%	12h-%	24h-%	WTP-2h	WTP-6h	WTP-12h	WTP-24h
1	all villages	-	-	-	-	987	21,7	158	74.542	28.608	4,95	59%	22%	4%	7%	26.542	33.727	38.857	41.515
2	all villages	Households	-	-	-	906	19,9	145	69.301	28.216	4,96	62%	23%	4%	7%	26.254	33.886	38.529	41.094
3	all villages	Public-Services	-	-	-	19	110,2	na	128.175	53.158	6,00	32%	16%	5%	5%	45.000	30.000	50.000	80.000
4	all villages	Commercial	-	-	-	62	21,3	na	134.688	26.935	4,09	24%	10%	0%	2%	30.000	30.000	-	30.000
5	BEjjeje	-	-	-	-	135	34,0	248	84.666	29.320	7,01	44%	28%	7%	13%	27.797	33.947	35.556	40.000
6	Bejjeje	Households	-	-	-	128	23,2	169	87.448	28.500	7,01	46%	30%	7%	13%	27.797	33.947	35.556	40.000
7	Bejjeje	Households	Network-YES	-	-	13	27,3	199	99.214	34.286	6,00	69%	23%	0%	15%	38.889	20.000	-	35.000
8	Bejjeje	Households	Network-NO	-	-	115	22,7	166	86.118	27.857	7,14	43%	30%	8%	13%	25.800	35.143	35.556	40.667
9	Zabboud	-	-	-	-	184	20,5	150	71.589	28.691	6,53	40%	33%	7%	9%	24.658	33.770	41.667	46.471
10	Zabboud	Households	-	-	-	173	20,9	152	72.164	28.278	6,42	42%	35%	7%	9%	24.658	33.770	41.667	44.375
11	Zabboud	Households	Network-YES	-	-	92	22,8	166	67.871	31.304	6,13	42%	40%	11%	7%	26.410	32.703	38.000	43.333
12	Zabboud	Households	Network-NO	-	-	81	18,7	136	77.039	25.114	6,80	42%	30%	2%	12%	22.647	35.417	60.000	45.000
13	Ain	-	-	-	-	404	18,5	135	63.593	27.797	4,10	73%	19%	2%	5%	26.020	32.000	31.429	38.095
14	Ain	Households	-	-	-	375	18,3	134	58.527	27.413	4,11	74%	18%	2%	5%	25.399	32.029	31.429	38.500
15	Ain	Households	Network-YES	-	-	347	18,4	134	57.314	27.262	4,08	74%	19%	2%	5%	25.234	31.818	28.333	40.556
16	Ain	Households	Network-NO	-	-	28	17,1	125	73.561	29.286	4,54	71%	11%	4%	7%	27.500	36.667	50.000	20.000
17	Nabi Osmane	-	-	-	-	60	16,6	121	62.446	29.833	6,53	52%	12%	7%	12%	32.581	37.143	50.000	45.714
18	Nabi Osmane	Households	-	-	-	60	16,6	121	62.446	29.833	6,53	52%	12%	7%	12%	32.581	37.143	50.000	45.714
19	Nabi Osmane	Households	Network-YES	-	-	18	16,3	119	66.970	30.000	4,22	78%	11%	6%	6%	25.714	50.000	60.000	20.000
20	Nabi Osmane	Households	Network-NO	-	-	42	16,7	122	60.507	29.762	7,87	40%	12%	7%	14%	38.235	32.000	46.667	50.000
21	Labwe	-	-	-	-	204	22,5	164	95.746	29.265	3,56	64%	19%	1%	2%	26.769	36.154	40.000	37.500
22	Labwe	Households	-	-	-	170	21,1	154	78.911	29.118	3,49	75%	21%	1%	2%	26.772	36.944	35.000	37.500
23	Labwe	Households	Network-YES	-	-	142	20,3	148	83.524	28.944	3,60	73%	23%	1%	3%	26.731	35.313	50.000	37.500
24	Labwe	Households	Network-NO	-	-	28	24,8	181	55.516	30.000	2,93	82%	14%	4%	0%	26.957	50.000	20.000	-
25	all villages	Commercial	Network-YES	-	-	27	17,4	na	127.228	29.259	4,19	52%	22%	0%	4%	30.000	30.000	-	30.000
26	all villages	Commercial	Network-NO	-	-	35	24,3	na	140.443	25.143	2,00	3%	0%	0%	0%	30.000	-	-	-
27	all villages	Public-Services	Network-YES	-	-	12	37,1	na	175.352	45.000	6,00	50%	25%	8%	8%	45.000	30.000	50.000	80.000
28	all villages	Public-Services	Network-NO	-	-	7	235,4	na	47.300	67.143	0,00	0%	0%	0%	0%	-	-	-	-
29	all villages	Households	Network-YES	-	-	612	19,7	143	66.156	28.499	4,33	69%	23%	3%	5%	26.019	32.857	36.667	39.677
30	all villages	Households	Network-NO	-	-	294	20,4	149	75.848	27.660	6,43	49%	24%	5%	11%	26.944	35.915	40.625	42.424
31	all villages	Households	Well-YES	-	-	369	24,7	180	83.741	32.703	6,37	55%	27%	4%	13%	28.768	36.162	42.857	40.625
32	all villages	Households	Well-NO	-	-	537	16,6	121	59.379	25.225	3,96	68%	21%	4%	3%	24.848	31.875	35.500	42.500
33	all villages	Households	Network-YES	Well-YES	-	199	24,2	176	78.272	30.553	5,59	59%	28%	3%	10%	27.542	33.571	34.000	39.000
34	all villages	Households	Network-YES	Well-NO	-	413	17,5	128	60.318	27.512	3,72	74%	20%	3%	3%	25.428	32.381	37.692	40.909
35	all villages	Households	Network-NO	Well-YES	-	170	25,4	185	90.143	35.205	7,32	50%	25%	5%	16%	30.471	39.535	47.778	41.786
36	all villages	Households	Network-NO	Well-NO	-	124	13,6	99	56.249	18.511	4,95	48%	23%	6%	4%	21.864	30.357	31.429	46.000
37	all villages	Households	Network-YES	truck YES	-	190	20,9	153	101.680	30.471	3,89	72%	21%	5%	3%	28.382	33.000	37.778	60.000
38	all villages	Households	Network-YES	Truck-NO	-	422	19,1	139	50.162	27.607	4,52	68%	24%	2%	6%	24.895	32.800	35.556	35.769
39	all villages	Households	Network-NO	truck YES	-	69	20,9	153	132.951	30.870	4,90	59%	30%	0%	7%	26.098	37.143	-	56.000
40	all villages	Households	Network-NO	Truck-NO	-	225	20,3	148	58.336	26.749	6,95	46%	22%	7%	12%	27.282	35.400	40.625	40.000
41	all villages	Households	Satisfied-YES	-	-	162	16,5	120	42.321	28.344	3,63	77%	18%	2%	3%	25.200	36.897	45.000	44.000
42	all villages	Households	Satisfied-NO	-	-	450	20,8	152	74.737	28.556	4,58	66%	25%	3%	6%	26.364	31.802	34.286	38.846
43	all villages	Households	Meters-YES	-	-	775	20,2	147	72.186	30.386	4,86	65%	24%	4%	7%	26.871	34.595	37.419	45.660
44	all villages	Households	Meters-NO	-	-	131	18,1	132	52.232	16.735	5,72	47%	20%	2%	8%	21.148	28.846	50.000	19.091
45	All Villages	Households	service-2h-per-day	-	-	563	19,1	139	64.055	26.254	2,00	100%	0%	0%	0%	26.254	-	-	-
46	All Villages	Households	service-6h-per-day	-	-	210	22,0	160	78.484	33.886	6,00	0%	100%	0%	0%	-	33.886	-	-
47	All Villages	Households	service-12h-per-day	-	-	33	23,5	172	68.767	38.529	12,00	0%	0%	100%	0%	-	-	38.529	-
48	All Villages	Households	service-24h-per-day	-	-	64	28,1	205	114.097	41.094	24,00	0%	0%	0%	100%	-	-	-	41.094
49	All Villages	Households	Network YES	Well YES	Truck YES	5	22,3	163	95.245	20.000	4,80	60%	20%	20%	0%	10.000	20.000	50.000	
53	All Villages	Households	network NO	well YES	truck YES	16	34,0	248	207.046	32.500	5,33	44%	44%	0%	6%	30.000	34.286	-	70.000
50	All Villages	Households	Network YES	Well YES	Truck NO	194	24,2	177	77.835	30.825	5,61	59%	28%	2%	10%	28.000	33.818	30.000	39.000
54	All Villages	Households	network NO	well YES	truck NO	154	24,5	179	77.997	35.484	7,52	51%	23%	6%	18%	30.513	40.556	47.778	40.741
51	All Villages	Households	Network YES	Well NO	Truck YES	185	20,9	152	101.853	30.753	3,87	72%	21%	4%	3%	28.797	33.333	36.250	60.000
55	All Villages	Households	network NO	well NO	truck YES	53	17,0	124	110.583	30.377	4,77	64%	26%	0%	8%	25.294	38.571	-	52.500
52	All Villages	Households	Network YES	Well NO	Truck NO	228	14,7	107	26.617	24.868	3,59	75%	20%	2%	3%	22.807	31.556	40.000	25.000
56	All Villages	Households	network NO	well NO	truck NO	71	11,0	81	15.690	11.364	5,15	35%	20%	10%	1%	17.200	22.143	31.429	20.000
57	All Villages	Households	Bottled water YES	-	-	233	20,8	152	128.895	35.106	5,24	61%	25%	6%	7%	31.888	42.241	30.667	44.706
58	All Villages	Households	Bottled water NO	-	-	673	19,6	143	48.669	25.870	4,86	63%	23%	3%	7%	24.350	30.719	44.737	39.787
59	All Villages	Households	Network YES	Bottled water YES	-	136	20,7	151	127.144	33.212	4,91	66%	22%	6%	7%	32.556	37.333	26.250	32.222
61	All Villages	Households	Network NO	Bottled water YES	-	97	20,9	152	131.351	37.755	5,73	55%	29%	7%	8%	30.755	47.500	35.714	58.750
60	All Villages	Households	Network YES	Bottled water NO	-	476	19,3	141	48.731	27.143	4,16	70%	23%	2%	5%	24.247	31.636	45.000	42.727
62	All Villages	Households	Network NO	Bottled water NO	-	197	20,2	147	48.519	23.037	6,83	46%	22%	5%	13%	24.725	28.372	44.444	37.200
63	All Villages	Households	Well YES	Bottled water YES	-	110	23,9	174	143.198	38.182	6,26	51%	31%	5%	11%	33.036	45.588	38.333	45.833
65	All Villages	Households	Well NO	Bottled water YES	-	123	18,1	132	116.104	32.400	4,37	71%	20%	7%	4%	31.149	37.500	25.556	42.000
64	All Villages	Households	Well YES	Bottled water NO	-	259	25,1	183	58.489	30.385	6,42	57%	25%	3%	14%	27.143	31.231	46.250	38.889
66	All Villages	Households	Well NO	Bottled water NO	-	414	16,1	118	42.526	23.140	3,82	67%	21%	3%	3%	22.862	30.341	43.636	42.727
67	All Villages	Households	Truck YES	Bottled water YES	-	77	20,2	147	164.728	36.154	4,44	69%	23%	4%	5%	34.528	42.222	13.333	47.500
69	All Villages	Households	Truck NO	Bottled water YES	-	156	21,1	154	111.209	34.586	5,65	58%	26%	8%	8%	30.333	42.250	35.000	43.846
68	All Villages	Households	Truck YES	Bottled water NO	-	182	21,3	155	86.861	28.187	4,03	68%	24%	3%	3%	25.000	31.163	50.000	65.000
70	All Villages	Households	Truck NO	Bottled water NO	-	491	19,0	138	34.512	25.039	5,18	61%	22%	3%	8%	24.080	30.545	42.308	36.098

3.3 FINDINGS FROM CITIZENS/CUSTOMERS' SURVEY

3.3.1 Main findings in relation to research questions

3.1. What are current citizens/customers coping strategies for obtaining water in the study area?

- People that are connected to network, even with water scheme recently completed or upgraded, receive water on average only once **every 2 or 3 days for less than 2 hours.** Less than 10% of the sample declares to take water every day.
- Average actual consumption in the area is 145 l/capita/day.
- 95% of households have a private storage cistern of an average capacity of 2,5 m3. These cisterns are cleaned in most of the cases once a year and practically no one is doing any treatment for the stored water;
- Only 30% declares that the pressure is enough to fill the domestic roof storage tanks.
- 75% of the people who are taking water from the network declare to be not satisfied.
- Main alternatives in case of malfunction of water scheme are private wells or water trucking.
- **38% of the people interviewed have their own well** that has been constructed during the last 40 years;
- The well is used to extract an average of 3,6 m3 per week (per household and gardening).
- Only 25% of the sample is drinking bottled water
- 72% of those taking water from the network use it also for drinking.
- Among those who are taking water from network, 20% declare to do not pay any fees at all.
- 84% declare that the situation about water got worst during last year, but just 53% because of lack of rain, **38% attribute this to bad management.**
- **Awareness about water conservation is lacking in the whole area,** but more than 30% of the interviewees recognize that waste from privates is one of the main causes of water shortages;
- Water subscriptions rates are varying from one Municipality to another and are not just depending on the extension of the network. For completely covered municipalities they can range from 27% to 83%;
- New schemes or recently renewed schemes do not necessarily imply higher subscription rates;

3.2. How much do the population actually spend for water services (formal and informal providers)?

- Water trucking has an average cost of 5.900 LBP per m3.
- Average monthly cost to operate a private well is estimated in 54.000 LBP with 50% of the interviewees who are spending **20-30.000 LBP per month** (these values are in certain cases including also people that are using water from the well also for small agricultural activities, not just gardening).
- Average weekly cost for bottled water is 15.400 LBP.
- Total average expenditure water in the target area is 69.300 LBP/month per household (including public and alternative supplies);
- Where the public service is present and reliable the average water expenses are much lower.
- Private wells, considering costs for operating and perceived quality, are not real competitors to public network in case reliability of the network is achieved.

3.3 What are the expectations from a public water service in the study area?

- Expected hours of service from the network is in most of the cases (65%) just **2h per day,** or 6h (24%), only 7% is demanding 24 h service.

3.4. What is the perceived quality of water?

- **72%** of people connected to the network, use **network water for drinking** even if 76% of them do not know if water from network is analyzed or not.
- Among those who drink network water **only 11% use some forms of treatment.**
- Among those who declare that water is analyzed, **78% state that water is potable.**

3.5. What is the citizens/customers' willingness to pay for an improved public service?

- **90%** of the interviewees declare to be **ready to pay more for a reliable public service** and the assessed average willingness to pay (calculated in relation to the hours of service demanded) is **31.730 LBP/month** (approx. 20 USD).

3.6. To what extent are citizens/customers willing to accept water meters installation and a volumetric based fee?

- **91% of people are in favor of the introduction of water meters** and 85% declare that they could be useful for improving management.

3.7. Does a participatory approach using citizens/customers' surveys facilitate the implementation of effective water demand management programs?

It is not possible to provide final conclusions about this questions until the project will not be completed and the most important indicators will be verified (% of subscribers and of payers).

From the analysis of data collected it is in any case possible to state that the approach of using a "participative survey" has already shown some important results in terms of changing perceptions of the people about:

- Actual level of consumptions and costs incurred at household level. Many surveyors referred about the exclamation of surprise of some of the interviewees when they found out through their own calculations how much they are actually spending for water (especially for bottled water);
- Improved perceptions about possible benefits in economic terms from a reliable public service;
- Opinions about installation of water meters were expected to be completely adverse at the beginning of the survey. 91% declare themselves in favor of installation of water meters. Approximately 80% demanded actively the installation of water meters in order to improve the management of the service.

3.3.2 Main findings in relation to Wastewater sector

- **93% of people have a pit** with sizes getting up to 40 m3;
- Most of the people never desludged them yet, but those with smaller sizes declare to do it once a year for an **average cost of 78.000 LBP**;
- Assessed **willingness to pay for wastewater is 15.800 LBP per household per month.** This value is less reliable (because of the methodology of enquiry) in relation to the one for water service;
- 96% of the people declare that they would not re-use wastewater for irrigation, and **59% even if it would be treated;**
- Half of the people recognize as responsible for wastewater the Government, while the other half still see as responsible the Municipality;

3.3.3 Main findings in relation to Solid Waste Sector

- 94% of the interviewees use barrels installed by Municipality to get rid of solid waste, while **6% is still burning it;**
- There is no recycle at all, while **61% declare to reuse organic waste to feed animals;**
- Service of collection is provided on **average twice per week;**
- The role of the Municipality in this sector is recognized and **68% rate the service as good enough** even if people claim for a more frequent collection and bigger barrels.

Pressure test to verify level of service

GIS Customer DB survey

PART IV

GENERAL CONCLUSIONS

4.1 MAIN FINDINGS AND RECOMMENDATIONS

The present chapter resumes the main findings grouped for main topics as analysis of present cost recovery approach, tariff calculation and application, customer services and wastewater.

Even though the citizens/customers' survey only concerns a part of the Bekaa, the lessons learned can be applied in all the regions and should be taken into consideration, at the same level as the literature review and the main actors' survey, with a view to promote a deep and constructive debate in the sector in order to achieve best practices in cost recovery and demand management.

Under each topic, the findings and the recommendations are presented with a clear indication of their source:

- Literature review [LIT]
- Main actors survey [ACT]
- Citizens / Customers' survey [CITIZ]

The recommendations provided within this chapter are clearly marked with the tag **"REC"**.

4.1.1 Problem of cost recovery in Lebanese water sector

The general impression from interviews of the actors regarding cost recovery strategy is that of a scenario of diffused, variegated and often contradictory opinions with a wide range of responsibilities attributed to the principal stakeholders of the sector.

These intertwining responsibilities create a **vicious cycle** where final responsibilities are often shared between Establishments, National Government or generally national context and citizens. [ACT]

Public water sector in Lebanon is characterized by irregular standards of service and low rates of payment by citizens [LIT]. The majority of actors in Lebanese water sector think that there is in place no strategy for cost recovery or, if existing, it is considered not effective. [ACT]

The majority of the responses focused on problems related to management by the Establishments, especially in terms of poor culture of production control, lack of knowledge of real cost of water and absence of water demand management, compounded by lack of qualified staff and impossibility to set the tariffs. [ACT]

The limited capacity of the Establishments in setting adequate demand management measures, the scarce incidence of the central government in applying the reform of the sector and an adverse attitude of the citizens/customers toward public institutions are actual obstacles in breaking the vicious cycle. Government and Establishments are considered the main stakeholders that should take the first step to break it by elaborating an effective strategy. [ACT].

A generalized lack of trust in public institutions, political interferences and the Syrian crisis are considered as external factors affecting the whole sector. [ACT]

Citizens are also mentioned as responsible considering the low payments rates registered in the sector and the large number of illegal connections. [ACT]

REC - In order to set-up a strategy for improvement of cost recovery at Establishment level, different recommendations with different focuses have been proposed [ACT]. The most recurrent, apart a general improvement of services, are:

- Management at Establishment level:
  - o Reduction of Non Revenue Water (NRW)
  - o Metering demand and application of volumetric tariff;
  - o Improved knowledge of production costs and distribution costs and better application of a business plan approach;

- Customers level:
    - o Create awareness for payment
    - o Renew customer databases to identify illegal connections
- National government level:
    - o Support enforcement of law
    - o Promote independency of the sector from external political interferences

It is common opinion that in Lebanon there are not real successful experiences in cost recovery that could be used as example for replication by Establishments or by other actors. The few experiences conducted and their lessons learned have not been properly capitalized and/or shared with all the actors (if this has been done the impact of this shared knowledge is not appreciable in most of the actors interviewed) in order to draft a possible follow-up or to give recommendations for further development. [ACT]

4.1.2 Actual investment strategy

REC -At National level it would be important to properly balance the infrastructural investments (construction or rehabilitation) with adequate investments for guaranteeing proper operation and maintenance from Establishments. [ACT]

The field survey showed that new or renewed infrastructures do not necessarily imply sustained improvement of the service for the citizens/customers. The data collected from some of the municipalities where infrastructures have been renewed or extended in the last five-ten years (Ain, Labwe, Nabi Osmane) showed that levels of service are still inadequate and satisfaction of citizens/customers very low. Service provided is intermittent (every 2 or 3 days or even less) and not all the citizens are reached. Time of service is in most of the cases below 2 hours. [CITIZ].

4.1.3 Water tariff and cost recovery

Diffused lack of bulk meters at production level, and of proper reading and analysis of collected data, are major deficiencies in the managerial system of all the Establishments that do not have proper data to calculate the real production cost per cubic meter. Estimations and approximations in the calculation of the quantities produced have as a consequence approximations in the data entered in business plans and incapacity to properly monitor the Non Revenue Water (NRW); [ACT]

This lack of information affects directly the proper calculation of the tariff. Half of the interviewed actors are not able to say if the actual flat tariff applied in Lebanon could be sufficient to cover at least Operation and Maintenance Costs (OPEX) considering average levels of subscriptions and payments. [ACT]

Opinions of the respondents about real possibility to cover OPEX costs with the actual cost recovery strategy are contradictory. Half of the actors think that Establishments will not be able to achieve it, or maybe they will need a very long time. However, a similar number of respondents are convinced that OPEX costs could be covered within the next five years. [ACT]

It is common opinion that Return of Capital Investment costs (CAPEX), actually completely depending on foreign donations or loans, will never be covered, nor even considered, with actual strategy. Just a minority of interviewees thinks that actual tariff with high collection efficiency could cover also capital investments. [ACT]

The possibility to have different tariffs, in relation to the level of service provided, is considered by the large majority as not fair and not possible to be implemented within the area of the same Establishment. Differences could be accepted just between Establishments. [ACT]

The flat tariff actually in use does not incentivize any form of water demand management nor any resources conservation attitude. [ACT]

4.1.4 Water conservation and new water tariffs

The average quantity of water actually consumed by interviewed citizens (145 l/pers/day) can be considered already quite high in relation to national standards. [CITIZ]

REC -The flat tariff actually in use does not incentivize any form of water conservation. A volumetric tariff (actually it is under study by some Establishments a tariff with only one fix block) and in particular an increasing block tariff are the necessary steps to promote water conservation. [ACT]

Few interviewed actors proposed the application of an increasing block tariff also with the objective to support poor families. [ACT]

Awareness about water conservation has been promoted in the past through different campaigns that have been generally considered as useful. Even if outcomes are considered positive, up to date the real impact has never been assessed or in any case can be considered quite limited. [ACT]

Awareness about water conservation is lacking in the whole target area of citizens' survey, but more than 30% of the respondents recognize that waste from privates is one of the main causes of water shortages. [CITIZ]

REC - Awareness campaigns for water conservation should be conducted at national level and should be a continuous activity. [ACT]

REC -The main target for water conservation campaigns should be schools. The topic should be inserted directly in the curricula. [ACT]

4.1.5 Introduction of water meters

Water demand management through introduction of water meters and application of a volumetric tariff is one of the key points presented in the National Water Strategy [LIT]

Domestic water meters are considered as an important tool to improve management and reduction of illegal connections, and at the same time also to promote water conservation and equity in the service. [ACT]

The actual strategy for installation of water meters is not clear to many actors that even doubt the real existence of a strategy. Up to date the installation has been done mainly within the framework of infrastructural projects and a real volumetric tariff has never been applied. [ACT]

The introduction of a volumetric tariff, whatever the way it will be calculated, it is considered a crucial step in the right direction for the whole sector. [ACT]

Few pilot projects have been implemented up to date for the introduction of water meters but most of them cannot be considered as successful [ACT-LIT]

Even when it is declared that a form of volumetric tariff is applied on top of the flat tariff (consumptions above 1m3 per day), in most of the cases Establishments are not making real follow-up as they lack personnel and capacity to read and maintain the meters. [ACT-LIT]

The expected level of citizens/customers' acceptation for the installation of water meters and application of volumetric tariff is generally uncertain: half of the actors think that it will be very bad while the other half is much more optimistic. [ACT-LIT]

Within the survey target areas, the great majority of interviewed citizen (more than 90%) is favorable to the introduction of water meters. It is interesting to note that citizens who are more worried about the introduction of water meters are those who are actually consuming less. [CITIZ]

REC - The recommended advices [ACT] for installing domestic meters are:

- Provide 24h service before applying the volumetric tariff;

- Create awareness before installation;
- Apply volumetric tariff at the same time of installation;
- Target areas estimated to be more receptive (urban areas in particular).

Up to date no project has been proposing any adequate social campaign for promoting the introduction of water meters to final customers and let them understand the whole process [LIT].

As already demonstrated by previous experiences in other parts of the country, and confirmed by many main actors, the problem of introducing water meters is political more than real acceptation of citizens [LIT+ACT].

4.1.6 Lack of trust and role of stakeholders

Relations between Establishments and citizens can be described with a general "lack of trust". Some citizens do not even know the role of Establishments and many still identify Municipality as the main responsible for provision of water services. [ACT-CITIZ]

The same expression, "lack of trust", can be used also to describe relations between Establishments and Municipalities. It should be stressed that in certain cases this relation is positive, depending on the quality of service provided and on the rate of subscriptions/payments of the area. [ACT]

Even if, since law 221, Municipalities have no longer a formal role in the water sector, the majority of actors declare that Municipalities are still playing a role to overcome the deficiencies of the service [ACT] and many citizens/customers still identify them as the main responsible for provision of public services. [CITIZ]

REC - The large majority of actors [ACT] are in favor of giving a role to Municipalities, like:
- Representation of citizens in front of Establishments;
- Promotion of payments to Establishments and support in enforcing law against illegal connections;
- Contribution in creating awareness for citizens

REC - Involving and strengthening Unions of Municipalities could represent an additional tool for planning multi-municipal projects (especially for wastewater projects) and for supporting the Establishments in terms of follow-up for subscriptions and payments from households. [ACT]

REC - A mutual social control among citizens is fundamental to identify and stigmatize illegal connections and water wastage. This **cultural change** can be promoted with awareness campaigns, reinforcement of civil society and a simultaneous improvement of transparency and communication at management level. [LIT] Citizens' participation is generally perceived as positive, although many actors consider it difficult to implement in Lebanon, where a participatory culture is absent both at institutional level and at citizens' level. [ACT]

REC - The majority of actors are favorable to improve the participation of citizens. The first step to improve relations between citizens and institutions is to start considering them as a real stakeholder in the sector. [ACT] Citizens should be brought more close to public institutions especially with roles of control and follow-up. Better knowledge of their opinion and their demand are considered as the starting point for their involvement. [ACT]

REC - Establishments should invest in communication with customers (citizens and Municipalities) in order to improve awareness and empower citizens with information. To conduct this communication this they should employ specialized staff. [ACT]

REC - Creation of committees could be a step toward more participation, but a law for regulating them is needed before they can become effective. [ACT]

REC - To achieve these objectives it is strictly necessary to create trust through dialogue between the parties (Establishment, Municipalities, citizens) and information sharing. [LIT]

4.1.7 Subscriptions and Payment of fees

Low subscription rates and low payment rates are common to most of the Establishments (at least Bekaa, North and South). These are mainly due to the vicious cycle fomented by the low quality of the service provided, the lack of trust in public sector, the incapacity to enforce the law and the wide spread of illegal connections. [ACT]

The problem of low payment rate can be considered similar to the one of low subscription rate, but in this case Establishments have a larger responsibility because they do not implement adequate follow-up for collecting payments. [ACT]

REC - Strategies of incentives for promoting subscriptions and payments have been already tried, but with limited results, by all the Establishments. Improvement of service and launch of awareness campaigns are mostly considered the best tools to achieve these results. [ACT]

A relevant number of actors still think that in Lebanon the correlation between improvement of the service and increase of subscriptions is not evident. Establishments confirm instead the existence of a certain correlation when infrastructural improvements are provided. [ACT]

The correlation between level of service and yearly payments is considered much more unpredictable than the one with subscriptions and in any case depending more also on additional factors like Establishments follow-up. [ACT]

At the same time, 90% of interviewed citizens/customers declare to be ready to pay more for a reliable and regular public service. The estimated average acceptable value is 31.730 LBP/month for a minimal, but reliable, service [CITIZ].

These points reinforce the statements made previously that it is necessary to invest not only in infrastructures but also in reinforcing the management of the Establishments, emphasizing the importance of awareness for water cost recovery (payment for water), up to now scarcely addressed. [ACT]

REC - Recommendations [ACT] for awareness campaigns related to payments of water are:

- Design campaigns after having listened to citizens real concerns;
- Let citizens visualize economic advantages achievable by using public water services instead than alternative sources (bottled water, water trucking, private wells);
- Communicate achievements of the Establishments but also the problems Establishments are facing every day in order to increase transparency in the management.

4.1.8 Reliability of service and willingness to pay

The actual costs incurred by private households (avg of 69.000 LBP/HH/month) is **2-3 time higher** than what they would be supposed to pay in case of reliable service from the network. [LIT-CITIZ]

Those citizens who cannot consistently rely on public service have invested in alternative options in order to secure a reliable water supply. The costs of these alternative options are much more expensive than the price demanded by Establishments for public service. [CITIZ]

Lack of payment, upon citizens' declarations, is mainly related to lack of reliable service from the public sector. Reliability is the most important parameter that citizens are demanding for the service. [CITIZ] This is even more significant considering that in targeted areas, people's expectations about public service performance are minimal (the majority of the citizens requests only 2 hours service per day). [CITIZ]

It is often considered that citizens do not want to pay for public services because of the competition with private wells. The survey shows that citizens using their own well are incurring in much higher costs than those they would face in case the service from the network was reliable. [LIT-CITIZ]

There have not been major studies in Lebanon to assess citizens/customers' willingness to pay or, if they have been conducted, the results have not been properly communicated. [ACT]

It is diffused opinion that citizens, in exchange for a better and reliable service, would be ready to pay even more than the actual tariff. [ACT]. This is confirmed by citizen survey enhancing that **up to an average price of 31.000 LBP/month the service would be more than competitive** (Assessed willingness to pay in relation to the expected level of service). [CITIZ]

This declared willingness to pay in most of the cases is referred for a service of only 2 hours; more hours of service will guarantee higher satisfaction to the citizens/customers and more loyal customers. [CITIZ]

4.1.9 Customer services

"Reliability of the service" is achieved not only with technical improvement of the service but at the same time with proper customer services and communication in order to gain "a reliable trust" of the citizens. [ACT]

Customer Services in the Water sector are considered of very low quality, or practically non-existent. The same as in the whole public sector in Lebanon, where the culture for pro-active customer services is completely absent. [ACT]

REC - Establishments should take the example from private companies and have a proactive attitude toward customers instead of just acting on a reactive basis. [ACT]

It is evident from the citizens/customers' survey that most of the citizens/customers do not really know the provider of public water services. Even when the public provider is known or recognized it can be stated that there are no real formalized channels of communication between Establishment and customers. [CITIZ]

4.1.10 Water Quality

One of the problems for most of the citizens is the perception of the quality of water provided through water network. People should be **aware if they can rely or not on water from the network for drinking** in order to consider it as a real substitute of bottled water. [CITIZ]

REC - It is important to **conduct regular analysis** but it is also equally important for citizens that results are properly **communicated on regular basis.** [CITIZ]

Almost every household relies on domestic water storage (in some cases shared) but a very small percentage (8%) treats water before using it. [CITIZ]

REC - Specific campaign of awareness should be conducted in order to **enable citizens to distinguish the different aspects that could affect water quality** (some of them trust the quality of water trucking even if they do not know from where the tank is filled). [CITIZ]

4.1.11 Wastewater sector

It is common opinion that the whole wastewater sector is lacking a clear strategy and that the tariff is just one of the many problems. [ACT]

Half of the people recognize as responsible for wastewater the Government, while the other half still see as responsible the Municipality. [CITIZ]

In rural areas the large majority of people (93%) is using pits (permeable) with sizes getting up to 40m3 (verified on the field). The few that need to de-sludge their pits declare to do it once a year for **an average cost of 78.000 LBP** (52 USD); [CITIZ]

Assessed **willingness to pay for wastewater is 15.800 LBP per household per month**. This value is less reliable (because of the methodology adopted in the interview) in relation to the one for water service. [CITIZ]

REC - The large majority of the actors think that wastewater tariff should be calculated as a proportion of the water consumed. [ACT]

REC - The recommended way to apply a wastewater tariff would be trough promotion of a general awareness about wastewater services and their management but first of all by showing that a service is in place. Only few actors recommended making use of environmental reasons to promote the application of wastewater tariff. [ACT]

4.2 FINAL COMMENTS FROM GVC

In this paragraph are presented conclusive comments and practical recommendations provided by GVC for specific aspects touched by this research in order to promote a future debate in the sector.

4.2.1 Problem of Cost Recovery and Actual investment strategy in place

One of the main obstacles in setting up an effective cost recovery strategy is that the actual strategy of investment in water sector in Lebanon is too much unbalanced toward improvement of production and too little on management of the demand and operation and maintenance.

REC - From a technical inspection conducted by GVC in few areas in Bekaa, it is **relatively easy to guarantee higher level of services** in areas already served by proposing small technical improvements of the schemes (it is possible to reach a reliable 24h service, taking in consideration only 12h of availability of electricity) and by concentrating the major investment **in proper follow-up and demand management**. The cost of these managerial improvements is very low if compared with possible benefits in terms of service and cost-recovery.

REC - As the capacities and resources of Establishments are often not sufficient to guarantee regular follow-up and monitoring of the services, projects should support the Establishment in **capacity building and assistance for the operators for a period of at least 1 or 2 years** after the completion of the infrastructural works in order to assure proper and transparent operation and maintenance.

Considering the core problem related to luck of trust in existing institutions, no program should weaken the image of the Establishments and take their place in front of citizens: **assistance should not be confused with substitution.** It is not the task of external actors to finance temporary solutions for direct operation of the infrastructure. They should just accompany the process: support Establishments' staff in applying demand management measures, guarantee the promotion of dialogue between the parties and the respect of minimal performance indicators (payment from one side, service from the other).

REC - As mentioned by many Actors, the first step to break the vicious circle, where the Lebanese Water sector is actually trapped, should come from Establishments and Government. A new harmonized strategy should be set-up in order to target at the same time improvement and reliability of the service and reduction of Non Revenue Water.

4.2.2 Water conservation and new water tariffs

The tariff actually applied (single step after 1m3/day) does not constitute a real barrier against overuse of water and waste.

Water schemes are dimensioned by NWSS with an average of 165-180 l/pers/day (excluding losses). Considering that an average family is composed by 4,5 elements, the designing capacity of the schemes is for approximately 750 liters/day while the actual tariff allows the customer to use up to 1000 liters/day.

This negative difference between quantity of water produced and quantity of water sold determines a **negative unbalance** that hampers proper management of infrastructures.

The actual assessed quantity of water consumed is already estimated to be close to design values (145 l/pers/day). This quantity is consumed despite a very high average cost due to high reliance on private suppliers (69.000 LBP per month corresponding to 47 USD).

When served by a reliable public service the price would consequently lower. If no practical measures are taken in order to limit household consumptions it can be expected an unsustainable demand not only for the technical capacity of the infrastructure but also in terms of natural resources.

REC - This aspect should be properly taken in account when defining strategies for promoting awareness campaigns but especially when there will be revision of the tariff structure for introducing a volumetric tariff. It is opinion of GVC that an **increasing block tariff** (with at least two steps) would serve better this scope than the one actually under study in Lebanon.

REC -To take in account low income households, it could be even considered the provision of a social tariff with a **lifeline block** at very low price (5-6 m3/month per household that should consider an average of approximately 35 l/pers/day) or even included in the subscription fee. For the second block, the tariff should be set in order to facilitate the access to additional 120-130 l/pers/day to a price that should be aligned with real cost of water (from 5-6 up to approx. 20 m3/month) and objectives of cost-recovery by the establishment. After this second block higher consumptions should be discouraged with higher tariffs.

4.2.3 Introduction of water meters

Unless water demand management policies are applied, whatever improvement of infrastructures will be done, it will not constitute a durable solution for reliable services.

Illegal connections cannot be reduced/eliminated unless a volumetric tariff that discourages illimited consumptions is enforced.

REC - The alleged resistance of citizens to installation of water meters should be addressed with specific awareness campaigns that could illustrate the functioning and the related billing system by volume.

REC - A specific approach taking in consideration social aspects should be considered whenever a water project is implemented in Lebanon. Customer surveys, like the one proposed in this research, can be useful for creating awareness and facilitate the introduction of water meters approach between the customers if applied before their installation.

REC - Listening and documenting the opinion of informed citizens about the possible introduction of water meters is very important also to have tangible data to defend this managerial (and environmental) choice against local political inferences.

REC - Monitoring and close follow-up in the year after the introduction of water meters will help the citizens to get used to volumetric tariff and to be able to understand and better manage their water bills.

REC - It should be stressed with communication campaigns that the water meter is also a tool for citizens to monitor the service provided by the Establishment. Through data from water meters they can support their complaints in case of low performance of the service in their area.

REC - It is very important an investment in **capitalizing** whatever **pilot experience** will be tested in Lebanon. Too little has still been tested and properly capitalized. Knowledge in the sector is often characterized more by rumors than by factual data.

REC - Capitalization of pilot experiences and proper communication campaigns at local and national level will help in promoting a culture of acceptance of water meters.

4.2.4 Lack of trust and role of stakeholders

Until the Establishments are not able to provide a reliable service and to have proper dialogue with citizens through proper customer services, they will always face difficulties in making citizens pay, unless a cutting policy is applied and illegal connections are stopped.

REC - Awareness campaign to inform citizens/customers of the role of Water Establishments should be widespread.

REC - Enforcement of cutting policy by the Establishment, especially in rural areas, is difficult unless supported by Municipalities. Even if Municipalities do not have any formal role in NWSS, collaboration with them is considered important because many citizens still identify them as the main responsible for provision of public services.

REC - An existing Lebanese law is specifying that 10% of the fees collected by the Establishments from citizens should be re-funded to the concerned Municipality. This law is rarely applied and probably not applied at all by the Government. If properly applied it could be a good leverage for promoting collaboration between Municipalities and Establishments in collecting water payments and enforcing cutting policy. It would be more effective if it were possible to condition this transfer of money from Establishments upon the achievement of certain indicators, like percentage of payments at least 80-90%, from the subscribers under the Municipal area.

REC - The main role of external actors like NGOs should be facilitation in promoting dialogue between the stakeholders (Establishments, Municipalities and Citizens).

4.2.5 Reliability of service and willingness to pay

Demand from citizens in terms of performances of the schemes can be considered as minimal (the majority in target areas is requesting only 2h per day). At least these minimal levels should be guaranteed by the Establishment in order to gain trust of the citizens/customers.

REC - Building trust between parties means not only that minimal service should be guaranteed, but also that there is clear commitment (also properly communicated) to continuous improvement.

REC - Proper follow-up should be conducted to assure the effective delivery of the service.

REC - Once citizens get aware of the real costs they are actually incurring to access water from alternative sources (too often not even quantified by themselves), they would be more easily convinced to pay for public services (in case these would be reliable). Replication of the citizens' survey presented with this research can be a tool for achieving this objective.

In terms of marketing, in rural areas there are huge markets of not satisfied water demand. Establishments could easily become the only service provider: **the alternatives in rural areas are too expensive to be really competitive with public service.**

It can be stated that informal alternatives (especially private wells) cannot be considered as real competitors of public service. With the current situation, people do not want to abandon wells because public service is not reliable. Once the reliability from public service can be guaranteed for at least a certain period of time, it can be expected that people will shift toward public services.

REC - Complete abandon of existing private wells is not always recommendable in rural areas, as they could constitute a valid alternative for outdoor uses like gardening. The proper balance between use of network and wells should be achieved with **a properly conceived tariff**. Block tariff strategy is recommended for this purpose.

4.2.6 Customer services

No adequate customer services are present to promote dialogue, reception of complaints and also for collection of fees.

Investment for improving customer services at Establishment level could shorten the distance between service provider and citizens/customers and start building trust between the parties.

REC - It would be important to have physical spaces (new decentralized offices) where the customers could interact with Establishments and identify the institutional responsible for provision of water service, address complaints and pay water fees.

REC – It would be essential that local staff employed by Establishments receive a proper training in how to communicate and represent the Establishment in front of the citizens. Proper procedures (not necessarily automatized) for reporting and control technical operations on the field are necessary to record and monitor technical parameters of the service (e.g.: hours of pumping, chlorine dosage, record of bulk meters data). Procedures for control are also a way to reduce possibility of mismanagement at local level and increase accountability of operators.

4.2.7 Water Quality

People should be **aware if they can rely or not on water from the network for drinking** in order to consider it as a real substitute of bottled water.

REC – It is necessary to focus better on the maintenance of networks in order to preserve water quality from the production to the households.

REC - Storage of water is a guarantee for customers to overcome possible problems of supply from the network in case of maintenance and could help in attenuating peak of consumptions during the day, so its use should not be discouraged. Domestic storage can bring contamination to the water unless proper hygienic measures are taken during storage and handling phases. Considering that most of the people mix water from different suppliers in the same tank, **awareness about proper management of domestic storage is necessary.**

Domestic chlorination could be encouraged with awareness campaign, but it should be taken in account that a relevant number of households (half of the target population) use metal tanks that could oxidize with high concentration of chlorine.

REC - Chlorination should be continuously provided at network level and it should be assured that residual chlorine is present at domestic level to reduce possible handling contaminations.

REC - Regular **publication of water analysis** could constitute one of the bases for starting a dialogue and promote accountability between Establishments and Customers. It can be one of the main aspects to focus when starting the investment in customer services improvement. Establishments' websites can be used for this purpose as also the physical documents used for water bills.

4.2.8 Wastewater sector

In order to promote a volumetric wastewater tariff based on water consumption, as recommended by the majority of the main actors, it is forcedly necessary to start first of all to install water meters and apply a volumetric tariff for the water sector.

4.3 FOLLOW-UP OF THE RESEARCH

The results of the citizens/customers' survey will be **monitored and evaluated during the follow-up of this research** that will accompany next project phases (Improvement of infrastructures, GIS customer DB, installation of water meters and billing applying a volumetric component) up to its end expected in December 2016.

In order to validate the findings of this research and promote real change in national policies, it is recommended to **repeat similar citizens' surveys in other areas** of Lebanon with the objective to have more reliable and comparable data between different regions.

It is considered particularly important the publication of the results of the surveys also to allow citizens to compare their personal situation with those of other citizens/customers in neighboring Municipalities or in other regions.

An online platform for uploading data and producing clear indicators should be considered as a valid option for the continuation of this research.

The whole research has been conceived with the objective to achieve the definition of a common and consensual strategy between the relevant actors intervening in the Lebanese Water sector.

Within the framework of the GVC project financed by European Union it will be **organized a workshop** where the same main actors in Lebanese Water sector will be invited to discuss and comment the findings of this research.

The proceedings of this workshop will constitute the final element of the research and will be published at the end of the process as addendum to this document.

Works for improving existing infrastructures

PART V

ANNEXES

5.1 Annex 1 – Main Actors Survey Questionnaire

NAME:	
ORGANISATION :	
GROUP MEMBERSHIP (ME&W / Establishment / Donor/ Expert / University / CDR)	
NATIONALITY : Lebanese / international	
# Years of Experience in Water sector…….….	
# Years of Experience in Lebanese Water sector…….	
DATE of INTERVIEW:	

CHAPTER 1 - COST RECOVERY

Q-1. Cost-recovery for water services what is the actual strategy and what are the constraints and challenges?

Q-2. What are in your opinion the best experiences in cost-recovery in Lebanon? And in particular in your establishment (please provide also possible contacts)? Why are these experiences important?

Q-3. Are there water meters at production level everywhere? How is it calculated the production cost?

Q-4. What are the strategies implemented at local level by Municipalities to overcome the actual deficiencies (if there are) of service?

Q-5. What is the % of subscribers in your area (municipality/establishment)? Why do you think the people are/ are not subscribing?

Q-6. What is the % of collection rate in your area? Why do you think people are/are not paying?

Q-7. What would you recommend as a strategy for improving water cost recovery at Establishment level?

Q-8. Would you recommend any incentive for improving subscription/payment?

Q-9. In national documents it seems that many of the problems of cost-recovery could be resolved by installing water meters. What do you think is the real contribution they would provide?

Q-10. What is the strategy for installing water meters? How did it go so far and when the volumetric tariff has been/will start to be applied? What was/is expected the level of acceptation?

Q-11. What kind of awareness campaigns about water cost recovery and water conservation have been done up to now? Do you think they have been useful? What would you recommend for creating awareness?

CHAPTER 2 - CUSTOMER SERVICES

Q-12. What do you think about customer services provided here in Lebanon?

Q-13. What do you think about links between establishments and the citizens/customers? And with Municipalities, they should be involved, and in case: how?

Q-14. What about solutions that could even involve more Municipalities in order to forward to the Establishments the needs, the constraints and to create more linkage between utility and citizens/ customers?

CHAPTER 3 - CALCULATION OF THE TARIFF

Q-15. Do you think that the water fees as are fixed for volumetric tariff now will be sufficient to cover OPEX costs? What should be the coverage level? When it is expected to be reached?

Q-16. What about CAPEX costs? How and when will this problem be solved?

Q-17. In the areas, where the service has been recently improved, the subscription and payment rate have been increasing? How much? The tendency is stable or does it decrease after some years?

Q-18. Some reports states that if we expect people to pay for water, the service should increase at the same level in terms of quantity, quality and especially **reliability**. If the Establishments do not have enough revenues for guaranteeing proper operation and maintenance all around their Regional Area, how can the level of service be guaranteed and how to assure that the new subscribers could keep paying?

Q-19. What do you think about charging local water fees calculated on the real direct cost of providing water at local level and guaranteeing proper transfer of indirect costs to the Establishment? Do you think this solution would be promoting more local cost recovery, as the service level would be directly affected by revenues collected locally?

Q-20. Some studies mention that the HH spend on average three times more for informal water suppliers in relation to what they pay to the Establishment through their annual fee. Do you think that citizens/ customers would pay more for a better and reliable service? Has any WTP survey been conducted in the area?

CHAPTER 4 - PARTICIPATION OF CITIZENS

Q-21. When we talk about citizens/customer participation in decision processes what is your point of view? Do you think they should be consulted about the level of service to be provided in order to align it with their willingness to pay?

Q-22. What about creating committee of citizens/customers that could take part in monitoring the management of the service and contributing in defining level of service?

Q-23. Internationally, participation of citizens in decision process for the water sector has been considered in the last years as a way to improve transparency and confidence into the managing structures with consequent increases of rate of payment and levels of service. What do you think about this statement in relation to Lebanon?

CHAPTER 5 - WASTEWATER

Q-24. How do you think should be calculated the tariff for wastewater.

5.2 Annex 2 - Household Survey Questionnaire Form

“the surveyor: please read the following statement to each hh surveyed before you ask the questions.

My name is ....., i am working for gvc in collaboration with the municipality and we are conducting a survey for a project conducted by the italian no-profit organization gvc in order to improve water services in the area.

We would like you to assist us by taking time to answer the following questions, your opinion is important for us for improve the service.

You have been chosen to take part in the survey on a purely random basis and all your answers will be treated confidentially.

If you do not wish to answer a particular question please leave it out.

We have received permission to conduct this study from the municipality.

Thank you for your co-operation. “

For Households only:

0. Personal data / معلومات شخصية

Field worker name / اسم العامل الميداني

0.0 village / القرية

0.1 name of the interviewed / اسم الشخص الذي أجريت معه المقابلة

0.2 age of interviewed / عمره

0.3 role of the interviewed in the household / دوره في البيت

0.4 name of the household owner: / اسم صاحب المنزل

0.5 phone number: / رقم الهاتف

0.6 occupation of the household owner: / وظيفة رب المنزل

0.7 other working member: / من يعمل أيضًا من أفراد الأسرة

- How many people less than 6 years / اقل من 6 السنوات
- How many people between 6 & 18 years / من 6 إلى 18 سنة
- How many people between 18 & 64 years / من 18 إلى 64 سنة
- How many people more than 64 years / أكثر من 64 سنة

For commercial and public services only:

0. Personal data / معلومات شخصية

Field worker name / اسم العامل الميداني

0.0 village / القرية

0.1 name of the interviewed / اسم الشخص الذي أجريت معه المقابلة

0.5 phone number: / رقم الهاتف

0.8 name of the activity

0.9 type of activity

- Commercial
- Industrial
- Public service

0.10 name of the responsible of the activity: / اسم صاحب المنزل

0.11 description of activity

- Small shop
- Medium size shop
- School
- Municipal office
- Mosque
- Church
- Other

For all categories:

1. Water storage / تخزين المياه

1.1 all - do you store water? / هل تخزن المياه

If yes 1.2 why do you store water? / إذا نعم لماذا تخزن المياه

1.3 what methods of water storage do your household use?

ما هي طرق تخزين المياه التي تسخدمها في منزلك

1.4 what is the material your tank is made of? / ما هي المادة المكوّن منها خزان المياه

If other material, pls specify….. / إذا غيرها، حدد

1.5 how much did it cost to build/install the tank? / كم كلفك بناء/ تركيب الخزان

1.6 what is the capacity of storage your household have (in liters)? ما هو حجم الخزان الذي تملكه

1.7 do you store for whom? / لمن تخزن المياه

1.8 do you store water for irrigation in a separate tank? Yes / no: / هل تخزن مياه الريّ في خزان منفصل

1.8.2 if yes, how big? / إذا نعم، ما هو حجمه

1.8.3 if yes, how far is it? إذا نعم، هل هو بعيد

1.9 do you store water from trucked water in a separate tank? Yes / no: / هل تخزن مياه الصهاريج في خزان منفصل

1.9.1 if yes, how big? / إذا نعم، ما هو حجمه

1.10 do you store water for drinking in a separate tank? Yes / no: / هل تخزن مياه الشرب في خزان منفصل

1.10.1 if yes, how big? / إذا نعم ، ما هو حجمه

1.11 do you store water for bathing in a separate tank? Yes / no: / هل تخزن مياه الإستحمام في خزان منفصل

1.11.1 if yes, how big? / إذا نعم ، ما هو حجمه

1.12 do you mix water from different sources in the same tank? Yes / no:

هل تخزن مياه من عدة مصادر في خزان واحد

1.12.1 if yes, how big? / إذا نعم، ما هو حجمه

1.13 do you store water from water network during distribution hours? Yes / no:

هل تخزن مياه الشبكة في خلال ساعات التغذية

1.13.1 if yes, how often do you fill it? / إذا نعم، متى تقوم بتعبئته

1.14 do you store tracked water? Yes / no: / هل تخزن مياه الصهاريج

1.14.1 if yes, how often do you fill it? إذا نعم، متى تقوم بتعبئته

1.15 do you store water from a well? Yes / no: / هل تخزن مياه البئر

1.15.1 if yes, how often do you fill it? / إذا نعم، متى تقوم بتعبئته

1.16 do you clean the cistern? Yes / no: / هل تنظف الخزان

1.16.1 if yes, how often? / إذا نعم، متى

1.17 how many days can your water storage last when there is no water supply?

ما هو عدد الأيام التي تكفيك مياه الخزان عندما لا تستفيد من مياه الشبكة

1.18 water treatment: what type of water treatment do you carry out on the water once it has been stored?

معالجة المياه : كيف تعالج مياه الخزان

- If other, pls specify…../ إذا غيرها ، حدد

2. Water network / شبكة المياه

2.1 do you have water network in your municipality? Yes / no: / هل لديك شبكة مياه في البلدية

2.2 do you take water from water network? Yes / no: / هل أنت مستفيد من شبكة المياه

2.3 do you receive enough (sufficient quantity) piped water from the water network for your use? Yes / no:

هل تصلك كمية مياه كافية من الشبكة

2.4 supply duration -how many days per week do you receive water?

ساعات التغذية – كم يوم في الأسبوع تصلك مياه الشبكة

2.5 the day you receive water, for how many hours? / كم ساعة تزود المياه في النهار

2.6 do you know when water will arrive yes / no: / هل تعلم متى تأتي مياه الشبكة

2.6.1 if yes - who is informing you? / إذا نعم، من يبلغك

2.7 does the water network have enough pressure to reach the water tank on your roof?

هل ضغط مياه الشبكة هو كاف ليضخ على خزان السطح

2.8 in case of malfunction of the water scheme, what do you do? / ما تفعل حيال وقوع عطل في الشبكة

2.9 what kind of problems does usually the water network have?

ما هي مشاكل شبكة المياه التي تواجهها عادة

2.10 when you have a problem with your water network to whom do you complain?

لمن ترفع شكوى لدى وقوع مشكلة ما في شبكة المياه

2.11 how many times have you or a member of your household made a request or complaint over the last one year?

كم من مرة قمت انت او احد افراد اسرتك بتقديم طلب أو شكوى في السنة الماضية

2.12 what/how is the average time to receive a response? / ما هو متوسط الوقت لحصولك على إجابة
2.13 what/how is the average time to receiving a repairing intervention?
ما هو متوسط الوقت الذي يحتاجه فريق الصيانة والتصليح ليلبي نداءك
2.14 if network water is not enough what do you do? / ماذا تفعل إذا لم تكفيك كمية مياه الشبكة
2.15 how is the quality of water you receive from network? 2.15.1 colour / لونها
2.15 how is the quality of water you receive from network? 2.15.2 taste / طعمتها
2.15 how is the quality of water you receive from network? 2.15.3 odor / رائحتها
2.15 how is the quality of water you receive from network? 2.15.4 general perception of the water
رأيك العام في مياه الشبكة
2.16 water treatment: what type of water treatment do you carry out on the water from network?
معالجة المياه : كيف تعالج مياه الشبكة العامة
2.16.5 if other pls specify….. / إذا غيرها حدد
2.17 do you use network water for drinking? Yes / no: / هل تستخدم مياه الشبكة للشرب
2.18 do you use network water for cooking? Yes / no: / هل تستخدم مياه الشبكة للطهو
2.19 do you use network for washing clothes? Yes / no: / هل تستخدم مياه الشبكة لغسل الملابس
2.20 do you use network for cleaning house? Yes / no: / هل تستخدم مياه الشبكة لتنظيف المنزل
2.21 do you use network for flush latrines? Yes / no: / هل تستخدم مياه الشبكة لتنظيف المرحاض
2.21.2 if no, what do you use? / إذا كلا، ماذا تستخدم لتنظيفه
2.22 do you know if water from network is analyzed? Yes / no: / هل لديك فكرة اذا تم تحليل مياه الشبكة
2.22.1 if yes, do you know the result? / إذا نعم، هل تعلم نتيجة التحليل
2.23 overall are you satisfied with the piped water supply? Yes / no:
بالمطلق، هل انت راض عن خدمة شبكة المياه
2.23.1 if yes, please explain why? / إذا نعم، إشرح لماذا
2.23.2 if no, indicate below: / إذا كلا، إختر السبب
2.23.2.5 other, please explain why / إذا سبب آخر، اشرح ما هو
2.24 if you are not connected to water network how do you get water? / إن كنت غير مستفيد من مياه الشبكة، ما هي طريقتك البديلة لتحصل على المياه
2.24.4 if other / إذا غيرها حدد

3. Water trucking / خدمة نقل المياه بالصهاريج

3.1 do you rely on water trucking? Yes / no: / هل تعتمد على خدمة نقل المياه بالصهاريج
3.2 how many times per week do you order a water truck?
كم مرة في الأسبوع تطلب خدمة نقل المياه بالصهاريج
3.3 how many liters per each water truck delivery? / كم ليتر مياه يتضمن الصهريج لدى كل نقلة مياه
3.4 how much do you pay? / كم تدفع لقاء هذه الخدمة
3.4.1 how much do you pay per m3? / ما هو المبلغ الذي تدفعه مقابل متر مكعب
3.4.2 how much do you pay per truck? / ما هو المبلغ الذي تدفعه مقابل نقلة مياه
3.5 how long does it take to deliver water when you place an order?
كم من الوقت تنتظر لتصلك خدمة نقل المياه
3.6 how is the quality of water you receive from water truck? / كيف تقيّم نوعية المياه المزودة عبر الصهاريج
3.7 do you know the sources from which water trucks obtain water?
هل تعلم مصادر المياه التي يلجأ إليها البائع لتعبئة الصهريج
3.7.8 a combination of sources (please specify) (عدة مصادر حدد ما هي)
3.8 water treatment: what type of water treatment do you carry out on the water from trucks?
معالجة المياه : كيف تعالج مياه الصهاريج
3.9 do you use trucked water for drinking? Yes / no: / هل تستخدم مياه الصهاريج للشرب
3.10 do you use trucked water for cooking? Yes / no: / هل تستخدم مياه الصهاريج للطهو
3.11 do you use trucked water for washing clothes? Yes / no: / هل تستخدمها لغسل الملابس
3.12 do you use trucked water for cleaning house? Yes / no: / هل تستخدمها لتنظيف المنزل
3.13 do you use trucked water for flush latrines? Yes / no: / هل تستخدمها لتظيف المرحاض
3.13.2 if no, what do you use? / إذا كلا ماذا تستعمل
3.14 why do you use water truck? / لماذا تعتمد على المياه المنقولة بالصهاريج
3.14.1 advantage of using water trucks / حدد إيجابية لإستعمال مياه الصهاريج
3.14.2 disadvantage of using water trucks / حدد سلبية لإستعمال مياه الصهاريج

4. Gardening/irrigation: / الحديقة / الري

4.1 do you have a garden? / هل لديك حديقة
4.2 if yes how big is your garden? / ما هو حجمها
- If yes what kind of plants do you have? / ما هو نوع المزروعات لديك
- If yes do you use fertilizers? / هل تستخدم أسمدة
4.3 how do you irrigate it? / كيف تروي الحديقة

4.4 how many times you irrigate per week? / كم مرة ترويها في الأسبوع
4.5 what kind of water do you use for irrigating? / أية مياه تستخدم لري الحديقة
4.6 what is the quality of the water you use for irrigating? / ما هي نوعية المياه المستخدمة في الري
4.7 would you drink this water? Yes / no: / هل تشرب من هذه المياه
4.8 how should be the quality of the water to be used for irrigation?
ما هي نوعية المياه المناسبة التي تستخدم في الري
4.9 are you working in agriculture? Yes / no: / هل تعمل في الزراعة
- If yes, - how big is your land? / ما هو حجم ارضك الزراعية
- If yes,- how do you irrigate it? / كيف ترويها
- If yes,- what do you culrivate? / ماذا تزرع فيها

5. Well: / بئر

5.1 do you have a well? (y/n) / هل تملك بئر
5.2 when did you dig your well? / متى حفرت البئر
5.3 is it a shared well or just for your household use? / هل هو بئر مشترك أو خاص لك ولعائلتك
5.4 if yes what is the depth of the well? / ما هو عمقه
5.5 why did you dig your well? / لماذا حفرته
5.6 how far is from the house? / كم يبعد عن المنزل
5.7 how far is from the pit? / كم يبعد عن الحفرة الصحية
5.8 what is the capacity of the well (in inches)? / ما هو حجم البئر (كم إنش)
5.9 how many times per week do you use your well? / كم مرة تشغل البئر أسبوعيًا
5.10 how many hours per day do you use it? / كم ساعة تشغله في اليوم
5.11 how much does it cost to operate per month/day? / ما هي تكلفة تشغيل البئر بالشهر/ باليوم
5.12 do you use a generator? / هل تستخدم مولد كهرباء
5.12.1 if yes, what is the cost of the generator? / إذا نعم، ما هي كلفة المولد
5.12.2 if yes, what is the cost of fuel per month? / إذا نعم، ما هي كلفة المازوت شهريًا
5.13 in case of electricity from the grid, what is the cost of electricity per month to run the pump?
لدى ساعات التغذية الكهربائية من الشبكة، ما هي تكلفة الكهرباء الشهرية لتشغيل المضخة
5.14 how much water from the well you use for / ما هي كمية مياه البئر التي تستخدمها ل
5.14.1 household use .... / الإستعمال المنزلي
5.14.2 gardening .... / الحديقة
5.14.3 irrigation .... / الري
5.15 how is the quality of water you extract from the well? / كيف تقيم نوعية المياه التي ينتجها البئر
5.16 why do you use your well instead of other sources?
لماذا تعتمد على البئر بدلا من مصادر المياه الأخرى
5.17 advantage of using your own well / حدد إيجابية لإستعمالك بئرك الخاص
5.18 disadvantage of using your own well / حدد سلبية لإستعمالك بئرك الخاص

6. Bottled water: / زجاجات المياه

6.1 do you buy bottled water? / هل تشتري زجاجات مياه
6.2 how much bottled water you buy per day (liters per household)?
كم تشتري زجاجة مياه في اليوم (ليتر عائلة)
6.3 how much do you spend per week to buy bottled water?
ما هي التكلفة التي تدفعها أسبوعيًا لشراء زجاجات مياه
6.4 is it sealed bottled water? Yes / no: / هل الزجاجة محكمة الاغلاق
6.4.2 if no, do you know the source of the water? / إذا كلا، هل تعلم مصدر مياه الزجاجات
6.5 what do you do with your empty bottles? / ماذا تفعل في زجاجات المياه الفارغة
6.6 why do you buy bottled water? / لماذا تشتري زجاجات المياه
6.7 1 advantage of using bottled water / حدد إيجابية لزجاجات المياه
6.8 1 disadvantage of using bottled water / حدد سلبية لزجاجات المياه

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7. Water consumption and costs resume / ملخص إستهلاك المياه وكلفته

	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL LITER per week (Calculated)
DRINKING	7.01 - How many liter of network water used for Drinking?	7.02 - How many liter of Trucked water usedfor Drinking?	7.03 - How many liter of Private well use for Drinking?	7.04 - How many liter of Bottled water used for Drinking?	7.05 - How many liter of Other source water used for Drinking?	Total liter per drinking
BATHING/ WASHING	7.06 - How many liter of network water use for Bathing/ washing (10 lit / min) ?	7.07 - How many liter of Trucked water use for Bathing/ washing (10 lit / min)?	7.08 - How many liter of Private well use for Bathing/ washing (10 lit / min)?	7.09 - How many liter of Bottled water use for Bathing/ washing (10 lit / min)?	7.10 - How many liter of Other source water use for Bathing/ washing (10 lit / min)?	Total liter per bathing/ washing
CLEANING HOUSE	7.11 - How many litter of network water use for cleaning the house?	7.12 - How many litter of Trucked water use for cleaning the house?	7.13 - How many litter of Private well use for cleaning the house?	7.14 - How many litter of Bottled water use for cleaning the house?	7.15 - How many liter of Other source water use for cleaning the house ?	Tot liter per cleaning house
CLEANING VEGETABLE	7.16 - How many litter of network water use for cleaning the vegetable (1 lit / 10 sec)?	7.17 - How many litter of Trucked water use for cleaning the vegetable (1 lit / 10 sec)?	7.18 - How many litter of Private well use for cleaning the vegetable (1 lit / 10 sec)?	7.19 - How many litter of Bottled water use cleaning the vegetable (1 lit / 10 sec)?	7.20 - How many liter of other source water use for cleaning the vegetable (1 lit / 10 sec)?	Tot Cleaning vegetables
COOKING	7.21 - How many litter of network water use for Cooking?	7.22 - How many litter of Trucked water use for Cooking?	7.23 - How many litter of Private well use for Cooking?	7.24 - How many litter of Bottled water use for Cooking?	7.25 - How many liter of other source water use for Cooking?	Tot Cooking
GARDENING	7.26 - How many litter of network water use for gardening?	7.27 - How many litter of Trucked water use for gardening?	7.28 - How many litter of Private well use for gardening?	7.29 - How many litter of Bottled water use for gardening?	7.30 - How many liter of other source water use for gardening?	Tot Gardening
FLUSHING TOILET	7.31 - How many litter of network water use for Flushing the toilet?	7.32 - How many litter of Trucked water use for Flushing the toilet?	7.33 - How many litter of Private well use for Flushing the toilet?	7.34 - How many litter of Bottled water use for Flushing the toilet?	7.35 - How many liter of other source water use for Flushing the toilet?	Tot Flushing Toilets
CLEANING CAR	7.36 - How many litter of network water use for Cleaning the car?	7.37 - How many litter of Trucked water use for Cleaning the car?	7.38 - How many litter of Private well use for Cleaning the car?	7.39 - How many litter of Bottled water use for Cleaning the car?	7.40 - How many liter of other source water use for Cleaning the car?	Tot Cleaning car
OTHER USES	7.41 - How many litter of network water use for other uses?	7.42 - How many litter of Trucked water use for other uses?	7.43 - How many litter of Private well use for other uses?	7.44 - How many litter of Bottled water use for other uses?	7.45 - How many liter of other source water use for other uses?	Tot Other Uses
COST PER WEEK	7.46 - COST PER WEEK (Network Liters/week)?	7.47 - COST PER WEEK (Trucked water Liters/week)?	7.48 - COST PER WEEK (Private well Liters/week)?	7.49 - COST PER WEEK (Bottled water Liters/week)?	7.50 - COST PER WEEK (other Liters/week)?	
TOTAL LITER PER MONTH (4,3 weeks - calculated)	7.51 - Total liter network ?	7.52 - Total liter Trucked ?	7.53 - Total liter Private well ?	7.54 - Total liter Bottled water ?	7.55 - Total liter other water ?	
TOTAL COST PER MONTH (Calculated)	7.56 - Total COST PER Month (Network / Liters)?	7.57 - Total COST PER Month (Trucked water /Liters)?	7.58 - Total COST PER Month (Private well / Liters)?	7.59 - Total COST PER Month (Bottled water / Liters)?	7.60 - Total COST PER Month (other / Liters)?	Tot cost per month
Total liter per person per day (4,57 people per HH - Calculated						

8. Water conservation / الحفاظ على المياه

8.1 do you think you are a person that is saving water? Yes / no: / هل تصنف نفسك كشخص يحافظ على المياه

8.1.1 if yes,how do you save water? / إذا نعم ، كيف تحافظ عليها

8.1.2 if not, where do you think you can reduce your water consumption?

إذا كلا ، أين تعتقد انك قد تحد من هدر المياه

9. Waste water / مياه الصرف الصحي

9.1 what is wastewater? / ماذا نعني بمياه الصرف الصحي

9.2 how do you get rid of waste water? / كيف تتخلص من مياه الصرف الصحي

9.3 do you know if there are difference between different types of wastewater?

أتعلم إذا كان هناك فرق بين مختلف انواع مياه الصرف الصحي

9.4 do you know the difference between grey and black water?
أتعلم ما الفرق بين المياه المبتذلة الرمادية والمياه المبتذلة السوداء
9.5 is there a sewage network in your village? Yes / no: / هل لديكم شبكة صرف صحي في قريتك
9.6 if yes, is your household connected to the network?yes / no:
إذا نعم هل انت مستفيذ من شبكة مياه الصرف الصحي
9.7 if yes, are you satisfied with the network? / إذا نعم هل انت راضٍ عن هذه الشبكة
9.8 do you know where the water is discharged? هل تعلم اين يتم التخلص مَن المياه المبتذلة
9.9 is the network connected to a treatment plant?
هل من محطة لمعالجة وتكرير مياه الصرف الصحي متصلة بالشبكة
9.10 do you have pit? / هل لديك حفرة صحية
9.11 if yes, how big is the pit? / إذا لديه حفرة، ما هو حجمها
9.12 if yes, is the pit completely sealed? Yes / no: / إذا لديه حفرة ، هل هي محكمة الإغلاق
9.13 if yes, where is located the pit in relation to the house? / لديه حفرة- كم تبعد عن المنزل
9.14 if yes, where is located the pit in relation to the well (if they have)?
(لديه حفرة ، كم تبعد عن البئر (إذا كان لديهم
9.15 if yes, how do you dislodge it? / لديه حفرة ، كيف تقوم بتفريغها
9.16 if yes, how often do you dislodge it? / لديه حفرة ، متى تفرغها
9.17 how much does it cost to do so? / لديه حفرة ، كم تبلغ كلفة التفريغ
9.18 is it expensive in your opinion? Yes / no: / لديه حفرة ، هل الكلفة غالية برأيك
9.19 do you know where your wastewater is released? لديه حفرة، هل تعلم اين يتم التخلص من مياه الصرف الصحي
9.20 what do you do? ليس لديه حفرة ، ماذا تفعل
9.21 why you do not have a pit? / ليس لديه حفرة ، لماذا لا يوجد لديك حفرة صحية
9.22 would you reuse wastewater for gardening or irrigation? هل تعيد إستخدام مياه الصرف الصحي للحديقة أو للري
9.23 and if it would be treated, would you reuse it for gardening or irrigation?
في حال تمت معالجة المياه المستخدمة، اتعيد إستخدامها للحديقة وللري
9.24 what do you think is the effect of waste water on environment in general
ما هو برأيك تأثير المياه المبتذلة على البيئة بشكل عام
9.25 what is the effect of wastewater on water and wells? / ما هو أثر المياه المبتذلة على المياه والآبار
9.26 what is in your opinion the best solution to deal with wastewater?ما هو برأيك الحل الأفضل لمعالجة مشكلة مياه الصرف الصحي
9.27 what do you propose to solve this problem? / ماذا تقترح كحل لهذه المشكلة
9.28 who in your opinion is responsible to solve this problem? / من هو برأيك المسؤول لحل المشكلة
9.29 do you pay a tariff for the connection to the sewage? / هل تدفع تعرفة شبكة مياه الصرف الصحي
9.30 if yes, how much do you think you spend now per month for dealing with your wastewater?
كم تعتقد انك تدفع شهريًا لحل مشكلة مياه الصرف الصحي
9.31 who in your opinion is the final responsible for paying the wastewater that is produced at household level?
من هو برأيك المسؤول النهائي عن دفع أعباء مياه الصرف الصحي المنتجة في المنزل
9.32 how much would you pay for having a sewage connection and to do not have to care about dealing with wastewater?
Bidding for wastewater ما هو المبلغ الذي انت مستعد ان تدفعه مقابل شبكة مياه صرف صحي ومقابل عدم تكفلك لحل مشاكلها

10. Solid waste / النفايات الصلبة

10.1 where do you collect garbage? / أين تجمع القمامة
10.2 how do you get rid of garbage? / كيف تتخلص من القمامة
10.3 how often do you get rid of garbage? / كل متى تتخلص منها
10.4 what do you do with organic waste? / ماذا تفعل بالنفايات العضوية
10.5 do you reuse any items? / هل تعيد إستخدام بعض النفايات
10.6 do you recycle any items? / هل تعيد تدوير بعضها
10.7 who is collecting the garbage? / من يجمع القمامة
10.8 how often are they collecting? / متى يجمعونها
10.9 is the service provided good enough? / هل خدمة تجميع النفايات جيدة
10.9.1 yes, why? / نعم ، لماذا
10.9.2 no, why? / كلا ، لماذا
10.10 what would you recommend in order to improve the service? / بماذا تنصح لتحسين الخدمة
10.11 where do the trucks collecting garbage are getting rid of garbage?
أين يتخلص سائقو الشاحنات من النفايات
10.12 are there people burning their garbage close to your house? هل يقوم السكان بحرق النفايات بالقرب من منزلك
10.13 are people burning garbage close to your municipality? / هل يقوم السكان بحرق النفايات بالقرب من البلدية

11. Water fees / تكاليف المياه

11.1 do you have water subscription? Yes / no: / هل لديك اشتراك مياه

11.2 if yes, how many cubic meters is the subscription in m3? / بكم متر مكعب انت مشترك

11.3 do you have a gauge for controlling water quantity? Yes / no: / هل تملك عيار لتتحكم بكمية المياه

11.4 how much is the tariff for water per year? / ما هي تعرفة المياه في السنة

11.5 do you pay water fees? Yes / no: / هل تدفع تكاليف المياه

11.5.1 if not why? / إذا كلا لماذا

11.5.2 if other please specify? / إذا اخرى حدد

11.6 to whom do you pay (or are you supposed to pay) water fees?
لمن تدفع (من المفترض ان تدفع) تكاليف المياه

11.6.1 if other please specify? / إذا اخرى حدد

11.7 how do you pay for your water bills? / كيف تتم طريقة الدفع

11.8 how often do you pay the water bills for your household? / متى تدفع فواتير المياه

11.8.5 other (specify)..... / (غيرها، حدد)

11.9 how often per year would you prefer to pay? / كم مرة في السنة تفضل ان تدفع

11.10 do you have any complaints about the present billing system for water? Yes / no:
هل لديك اية شكاوى حول نظام جمع الفواتير الحالي

11.10.1 yes, what? نعم ما هي

11.11 when you have a problem with your water supply for billing to whom do you complain?
في حال واجهت مشكلة فيما يخص فواتير مياه الشبكة. إلى من ترفع الشكوى

11.12 how much do you pay per month for generator subscription? / كم تدفع شهريا لاشتراك المولد

11.13 how much is your monthly electricity bill from network? / كم فاتورة الكهرباء الشهرية من شبكة

11.14 how many rooms do you have in the house? / كم غرفة في منزلك

11.15 how is it calculated the electricity bill? / كيف تحسب فاتورة الكهرباء

11.16 do you consider your monthly total expense for electricity (generator + network) to be reasonable?
هل تعتقد ان فاتورتك الشهرية (اشتراك المولد + الشبكة) هي معقولة

11.16.1 yes, why? / إذا نعم لماذا

11.16.2 no, why? / إذا كلا لماذا

11.17 in your opinion who should be responsible for water networks operation and maintenance?
برأيك من هي الجهة المسؤولة عن تشغيل شبكة المياه وصيانتها

11.18 do you think what you pay matches your consumption? Yes / no:
هل تعتقد ان ما تدفعه يتناسب مع ما تستهلكه

11.18.2 if no, how would you suggest to line up consumption with tariff?
إذا كلا، كيف تقترح ليتوازن الإستهلاك مع التعرفة

11.19 what do you think about water meters? / ما رأيك بعدادات المياه

11.20 do you think they could be useful? Yes / no: / أتعتقد أنها مفيدة

11.21 what in your opinion is the biggest problem of water in lebanon?
ما هي برأيك مشكلة المياه الرئيسية في لبنان

11.22 did the situation of water worsen during the last years? Yes / no:
هل وضع المياه يتراجع في خلال السنوات الأخيرة

11.22.2 if yes, why? / إذا نعم لماذا

11.23 do you think that water resources of lebanon are enough to overcome climatic change?
أتعتقد ان موارد المياه في لبنان هي كافية لتخطي التغير المناخي

11.24 do you think that water resources in lebanon are properly used?
أتعتقد ان موارد المياه في لبنان تستخدم على الوجه الصحيح

11.24.1 no, why? / إذا كلا لماذا

11.24.2 if yes, why? / إذا نعم لماذا

11.25 what do you consider is the most important factor for a “better service” for water network (just one answer)
ما هي في نظركم هو أهم عامل من أجل خدمة أفضل لشبكة المياه

11.25.1 if other why? إذا اخرى حدد

11.26 assume that you will be receiving clean water through the network with adequate quantity and quality, for how many hours would you prefer the service: تفترض أنك سوف تستقبل المياه النظيفة من خلال الشبكة مع كمية و نوعية مناسبة ، كم عدد الساعات التي تفضل الخدمة

11.27 in general, are you willing to pay more for a better service?
عمومًا، هل لديك إستعداد ان تدفع اكثر مقابل خدمة أفضل

11.28 do you know what is bekaa water establishment (bwe)? / هل تعرف ما هي مصلحة مياه البقاع

11.28.1 if yes, what are they supposed to do? / إذا نعم ، ما هو دورها

GUIDELINES FOR BIDDING GAME
المبادئ التوجيهية للعبة المزايدة

Opening statement to the bidding game (to the surveyor: please read this statement slowly to the respondent)

As you may know, water supply in lebanon is facing problems as many infrastructures are old and damaged and there have been many changes in responsibilities in the last years, now there is a new approach for improving the services at national level and the first step is to start by asking the opinion of the beneficiaries.

This is why we conducted the whole survey and why we are conducting this last exercise.

As you know for running water systems there are operational costs – bekaa water establishment (bwe) should spend a lot of money on electricity, chemicals, pipes, pumps, motors, and other equipment including staff salaries in order to purify the water, store it and transport it to your homes with pipes.

Water establishment such as bwe should be able to cover all operation and maintenance costs with some money left to finance improvements in water supply.

I will describe the nature of different types of possible service options to you and then ask whether you would like to have the services at a suggested price. During this procedure you shall have to think about the advantages of each different level of water service to your household.

Bwe has the intention of ensuring that each household should pay for water according to the type of service they receive and the amount of water used. Those who use more should pay more.

Before bwe carries out any improvements to the water services, it is important to know what type of water services people want, and how much money people are willing to pay for each type of improved service. With this information, bwe can then plan to give people the type of water service that the people want and are willing to pay for.

Now i am going to ask you some questions to learn whether your household would be willing to pay more money in order to improve the water supply service. It is important that you answer questions, as truthfully as you can so that we can know the amount you are willing to pay for an improved supply of water to your household.

"كما تعلم، تواجه إمدادات المياه في لبنان مشاكل عدة نظرًا إلى أنّ البنى التحتية أصبحت قديمة وتالفة، وقد طرأت تغييرات عدة في المسؤوليات خلال السنوات الأخيرة، والآن ثمة نهج جديد بهدف تحسين الخدمات على المستوى الوطني. أما الخطوة الأولى فتبدأ باستمزاج آراء المستفيدين .

هذا هو سبب قيامنا بهذه الدراسة.

ثمة عدة عوامل تتحكم بتكاليف تشغيل مصلحة المياه منها : الكهرباء، والكيماويات والتجهيزات ورواتب الموظفين فضلاً عن الصيانة. إن انخفاض في نسبة التحصيل (اكثر من 50%) أدى إلى إنخفاض في مستوى الخدمة لعدم توفر الاموال الكافية لتغطيتها والتي انتجت ايضا انخفاض في ساعات تغذية المياه.

من المهم لمصلحة مياه البقاع ان تعلم ما هو نوع الخدمة التي يريدها المستفيدون وكم هم مستعدون ان يدفعوا لقاء كل مستوى خدمة. إنطلاقًا من هذه المعلومة، بإمكان المصلحة ان تزود المستفيدين بخدمة المياه التي يريدونها لقاء مبلغ المال الذي عليهم تسديده.

لذلك، ساعطيك بعض الإختيارات لأعرف إذا كانت عائلتك على إستعداد أن تدفع أكثر بهدف تحسين الشبكة. فمن المهم جدًا أن تكون صريح وشفاف لدى في إجابتك لتحديد المبلغ التي تريد دفعه لقاء خدمة محسنة

Assume that you will be receiving clean piped water through the network with adequate quantity and quality for /
تفترض أنك سوف تستقبل المياه بالأنابيب نظيفة من خلال الشبكة مع كمية ونوعية كافية ل

How much you be willing to contribute per month?

5.3 Annex 3 - Consumption and Cost Tables per Village

Bejjeje

990 people

	water scheme 1st construction	renewal or rehabilitation	notes
a_Bejjeje	1970	2011	renewed to be connected to Labwe. Labwe Municipality did not allow the connection. Some households are connected to Ain

	area	cond1	cond2	cond3	cond4	sample	m3/month	l/pers/day	exp/month	WTP/month	avg h/serv	2h-%	6h-%	12h-%	24h-%	WTP-2h	WTP-6h	WTP-12h	WTP-24h
5	BEjjeje	-	-	-	-	135	34,0	248	84.666	29.320	7,01	44%	28%	7%	13%	27.797	33.947	35.556	40.000
6	Bejjeje	Households	-	-	-	128	23,2	169	87.448	28.500	7,01	46%	30%	7%	13%	27.797	33.947	35.556	40.000
7	Bejjeje	Households	Network-YES	-	-	13	27,3	199	99.214	34.286	6,00	69%	23%	0%	15%	38.889	20.000	-	35.000
8	Bejjeje	Households	Network-NO	-	-	115	22,7	166	86.118	27.857	7,14	43%	30%	8%	13%	25.800	35.143	35.556	40.667

AVG CONSUMPTION / COSTS TABLE — n. of respondants: 128

area: Bejjeje

condition 1: Households
condition 2:
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	2	2	19	14	9	45	
BATHING/ WASHING	lt / week	105	265	1.336	-	200	1.907	
CLEANING HOUSE	lt / week	45	111	815	-	104	1.075	
CLEANING VEGETABLE	lt / week	5	18	76	1	9	110	
COOKING	lt / week	3	4	43	6	14	69	
GARDENING	lt / week	13	120	1.032	-	136	1.302	
FLUSHING TOILET	lt / week	24	85	570	-	113	793	
CLEANING CAR	lt / week	-	5	62	-	15	81	
OTHER USES	lt / week	-	-	3	-	6	10	
TOTAL LITERS PER WEEK (calculated)	lt / week	198	610	3.956	21	606	5.391	
COST PER WEEK (declared)	LBP /HH/ week	240	3.613	9.658	6.743	82	20.337	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	0,85	2,62	17,01	0,09	2,61	23,18	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	6,20	19,14	124,08	0,66	19,01	169,09	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	1.033	15.537	41.530	28.997	351	87.448	LBP /HH/ month
						Willingness to pay:	28.500	LBP /HH/ month
						Expected hourse of service:	7,01	h / day

2 h/day:	46%	27.797	LBP /HH/ month
6 h/day:	30%	33.947	LBP /HH/ month
12 h/day:	7%	35.556	LBP /HH/ month
24 h/day:	13%	40.000	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE — n. of respondants: 13

area: Bejjeje

condition 1: Households
condition 2: Network YES
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	20	1	-	23	6	50	
BATHING/ WASHING	lt / week	805	481	1.175	-	292	2.753	
CLEANING HOUSE	lt / week	252	205	325	-	115	898	
CLEANING VEGETABLE	lt / week	50	58	58	1	18	185	
COOKING	lt / week	20	12	1	5	8	47	
GARDENING	lt / week	54	100	985	-	115	1.254	
FLUSHING TOILET	lt / week	240	238	434	-	200	1.112	
CLEANING CAR	lt / week	-	-	15	-	38	54	
OTHER USES	lt / week	-	-	-	-	-	-	
TOTAL LITERS PER WEEK (calculated)	lt / week	1.441	1.096	2.994	29	794	6.354	
COST PER WEEK (declared)	LBP /HH/ week	981	4.846	11.385	5.846	15	23.073	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	6,20	4,71	12,87	0,12	3,41	27,32	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	45,20	34,37	93,90	0,90	24,90	199,27	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	4.217	20.838	48.954	25.138	66	99.214	LBP /HH/ month
						Willingness to pay:	34.286	LBP /HH/ month
						Expected hourse of service:	6,00	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	69%	38.889	LBP /HH/ month
6 h/day:	23%	20.000	LBP /HH/ month
12 h/day:	0%	-	LBP /HH/ month
24 h/day:	15%	35.000	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE — n. of respondants: 115

area: Bejjeje

condition 1: Households
condition 2: Network NO
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	-	2	21	13	9	45	
BATHING/ WASHING	lt / week	26	241	1.354	-	190	1.811	
CLEANING HOUSE	lt / week	22	100	870	-	102	1.095	
CLEANING VEGETABLE	lt / week	-	14	78	1	8	101	
COOKING	lt / week	1	3	48	6	14	72	
GARDENING	lt / week	9	123	1.038	-	138	1.307	
FLUSHING TOILET	lt / week	-	67	586	-	103	757	
CLEANING CAR	lt / week	-	6	67	-	12	84	
OTHER USES	lt / week	-	-	4	-	7	11	
TOTAL LITERS PER WEEK (calculated)	lt / week	57	555	4.065	20	585	5.282	
COST PER WEEK (declared)	LBP /HH/ week	157	3.474	9.463	6.845	89	20.027	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	0,25	2,39	17,48	0,09	2,51	22,71	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	1,79	17,42	127,49	0,63	18,34	165,68	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	673	14.938	40.691	29.433	383	86.118	LBP /HH/ month
						Willingness to pay:	27.857	LBP /HH/ month
						Expected hourse of service:	7,14	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	43%	25.800	LBP /HH/ month
6 h/day:	30%	35.143	LBP /HH/ month
12 h/day:	8%	35.556	LBP /HH/ month
24 h/day:	13%	40.667	LBP /HH/ month

Zabboud

1.153 people

	water scheme 1st construction	renewal or rehabilitation	notes
b_Zabboud	1974	1990	less than half of the municipality has a network. It should have been supplied from Harbata. The connection has never been allowed by Harbata Municipality

	area	cond1	cond2	cond3	cond4	sample	m3/month	l/pers/day	exp/month	WTP/month	avg h/serv	2h-%	6h-%	12h-%	24h-%	WTP-2h	WTP-6h	WTP-12h	WTP-24h
9	Zabboud	-	-	-	-	184	20,5	150	71.589	28.691	6,53	40%	33%	7%	9%	24.658	33.770	41.667	46.471
10	Zabboud	Households	-	-	-	173	20,9	152	72.164	28.278	6,42	42%	35%	7%	9%	24.658	33.770	41.667	44.375
11	Zabboud	Households	Network-YES	-	-	92	22,8	166	67.871	31.304	6,13	42%	40%	11%	7%	26.410	32.703	38.000	43.333
12	Zabboud	Households	Network-NO	-	-	81	18,7	136	77.039	25.114	6,80	42%	30%	2%	12%	22.647	35.417	60.000	45.000

AVG CONSUMPTION / COSTS TABLE

n. of respondants: 173

area: Zabboud

condition 1: Households
condition 2:
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	21	3	9	8	8	49	
BATHING/ WASHING	lt / week	576	502	385	-	239	1.702	
CLEANING HOUSE	lt / week	251	243	219	-	90	802	
CLEANING VEGETABLE	lt / week	29	23	30	1	10	93	
COOKING	lt / week	40	10	19	5	12	86	
GARDENING	lt / week	35	159	532	-	484	1.210	
FLUSHING TOILET	lt / week	265	271	193	-	134	863	
CLEANING CAR	lt / week	11	7	18	-	11	47	
OTHER USES	lt / week	-	-	1	-	-	1	
TOTAL LITERS PER WEEK (calculated)	lt / week	1.229	1.217	1.406	14	988	4.853	
COST PER WEEK (declared)	LBP /HH/ week	1.512	8.359	2.954	3.814	143	16.782	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	5,28	5,23	6,04	0,06	4,25	20,87	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	38,53	38,18	44,08	0,44	30,98	152,22	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	6.503	35.943	12.704	16.398	615	72.164	LBP /HH/ month
Willingness to pay:							28.278	LBP /HH/ month
Expected hourse of service:							6,42	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	42%	24.658	LBP /HH/ month
6 h/day:	35%	33.770	LBP /HH/ month
12 h/day:	7%	41.667	LBP /HH/ month
24 h/day:	9%	44.375	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE

n. of respondants: 92

area: Zabboud

condition 1: Households
condition 2: Network YES
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	39	2	2	5	2	51	
BATHING/ WASHING	lt / week	1.062	544	282	-	116	2.004	
CLEANING HOUSE	lt / week	439	256	168	-	46	909	
CLEANING VEGETABLE	lt / week	52	22	11	0	5	90	
COOKING	lt / week	76	6	9	3	3	98	
GARDENING	lt / week	58	182	415	-	487	1.142	
FLUSHING TOILET	lt / week	493	272	111	-	66	943	
CLEANING CAR	lt / week	21	8	26	-	4	58	
OTHER USES	lt / week	-	-	2	-	-	2	
TOTAL LITERS PER WEEK (calculated)	lt / week	2.240	1.292	1.026	9	729	5.296	
COST PER WEEK (declared)	LBP /HH/ week	2.567	8.946	2.098	1.997	177	15.784	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	9,63	5,56	4,41	0,04	3,13	22,77	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	70,27	40,52	32,19	0,27	22,87	166,11	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	11.036	38.466	9.021	8.588	760	67.871	LBP /HH/ month
Willingness to pay:							31.304	LBP /HH/ month
Expected hourse of service:							6,13	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	42%	26.410	LBP /HH/ month
6 h/day:	40%	32.703	LBP /HH/ month
12 h/day:	11%	38.000	LBP /HH/ month
24 h/day:	7%	43.333	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE

n. of respondants: 81

area: Zabboud

condition 1: Households
condition 2: Network NO
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	-	5	16	12	15	47	
BATHING/ WASHING	lt / week	25	454	502	-	378	1.359	
CLEANING HOUSE	lt / week	37	227	277	-	139	680	
CLEANING VEGETABLE	lt / week	3	24	51	2	15	96	
COOKING	lt / week	-	14	30	6	23	73	
GARDENING	lt / week	9	133	665	-	480	1.287	
FLUSHING TOILET	lt / week	6	269	286	-	212	772	
CLEANING CAR	lt / week	-	7	9	-	20	35	
OTHER USES	lt / week	-	-	0	-	-	0	
TOTAL LITERS PER WEEK (calculated)	lt / week	80	1.132	1.836	20	1.282	4.350	
COST PER WEEK (declared)	LBP /HH/ week	315	7.692	3.927	5.877	105	17.916	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	0,34	4,87	7,90	0,09	5,51	18,71	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	2,49	35,52	57,60	0,63	40,20	136,44	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	1.354	33.077	16.888	25.269	451	77.039	LBP /HH/ month
Willingness to pay:							25.114	LBP /HH/ month
Expected hourse of service:							6,80	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	42%	22.647	LBP /HH/ month
6 h/day:	30%	35.417	LBP /HH/ month
12 h/day:	2%	60.000	LBP /HH/ month
24 h/day:	12%	45.000	LBP /HH/ month

Ain

8.431 people

	water scheme 1st construction	renewal or rehabilitation	notes
c_Ain	1970	2008	almost all the municipality is covered

	area	cond1	cond2	cond3	cond4	sample	m3/month	l/pers/day	exp/month	WTP/month	avg h/serv	2h-%	6h-%	12h-%	24h-%	WTP-2h	WTP-6h	WTP-12h	WTP-24h
21	Labwe	-	-	-	-	204	22,5	164	95.746	29.265	3,56	64%	19%	1%	2%	26.769	36.154	40.000	37.500
22	Labwe	Households	-	-	-	170	21,1	154	78.911	29.118	3,49	75%	21%	1%	2%	26.772	36.944	35.000	37.500
23	Labwe	Households	Network-YES	-	-	142	20,3	148	83.524	28.944	3,60	73%	23%	1%	3%	26.731	35.313	50.000	37.500
24	Labwe	Households	Network-NO	-	-	28	24,8	181	55.516	30.000	2,93	82%	14%	4%	0%	26.957	50.000	20.000	-

AVG CONSUMPTION / COSTS TABLE

n. of respondants: 375

area: Ain

condition 1: Households
condition 2:
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	37	3	4	7	3	54	
BATHING/ WASHING	lt / week	865	237	463	-	79	1.643	
CLEANING HOUSE	lt / week	444	125	296	-	45	910	
CLEANING VEGETABLE	lt / week	47	11	19	0	4	81	
COOKING	lt / week	48	5	12	2	2	69	
GARDENING	lt / week	23	9	297	-	115	444	
FLUSHING TOILET	lt / week	550	153	300	-	41	1.044	
CLEANING CAR	lt / week	4	1	8	-	1	14	
OTHER USES	lt / week	1	0	3	0	1	5	
TOTAL LITERS PER WEEK (calculated)	lt / week	2.018	544	1.403	9	290	4.265	
COST PER WEEK (declared)	LBP /HH/ week	3.338	4.235	3.305	2.659	75	13.611	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	8,68	2,34	6,03	0,04	1,25	18,34	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	63,30	17,06	44,01	0,29	9,11	133,76	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	14.352	18.210	14.210	11.432	323	58.527	LBP /HH/ month
Willingness to pay:							27.413	LBP /HH/ month
Expected hourse of service:							4,11	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	74%	25.399	LBP /HH/ month
6 h/day:	18%	32.029	LBP /HH/ month
12 h/day:	2%	31.429	LBP /HH/ month
24 h/day:	5%	38.500	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE

n. of respondants: 29

area: Ain

condition 1: Commercial + Public Services
condition 2:
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	222	-	3	19	-	244	
BATHING/ WASHING	lt / week	149	14	78	-	-	240	
CLEANING HOUSE	lt / week	606	78	362	-	-	1.046	
CLEANING VEGETABLE	lt / week	-	-	-	-	-	-	
COOKING	lt / week	122	-	4	11	-	137	
GARDENING	lt / week	7	-	-	-	34	41	
FLUSHING TOILET	lt / week	1.000	495	310	-	-	1.806	
CLEANING CAR	lt / week	1	-	1.346	-	-	1.347	
OTHER USES	lt / week	3	-	69	-	-	72	
TOTAL LITERS PER WEEK (calculated)	lt / week	2.110	586	2.172	30	34	4.933	
COST PER WEEK (declared)	LBP /HH/ week	3.784	6.552	15.328	4.362	-	30.025	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	9,07	2,52	9,34	0,13	0,15	21,21	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	66,19	18,39	68,12	0,94	1,08	154,72	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	16.270	28.172	65.909	18.757	-	129.108	LBP /HH/ month
Willingness to pay:							32.759	LBP /HH/ month
Expected hourse of service:							3,84	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	62%	35.556	LBP /HH/ month
6 h/day:	21%	31.667	LBP /HH/ month
12 h/day:	0%	-	LBP /HH/ month
24 h/day:	3%	30.000	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE

n. of respondants: 347

area: Ain

condition 1: Households
condition 2: Network YES
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	40	3	3	7	2	54	
BATHING/ WASHING	lt / week	934	222	421	-	81	1.658	
CLEANING HOUSE	lt / week	480	118	261	-	47	906	
CLEANING VEGETABLE	lt / week	51	10	18	0	4	82	
COOKING	lt / week	52	4	10	2	1	69	
GARDENING	lt / week	25	10	296	-	124	456	
FLUSHING TOILET	lt / week	594	141	268	-	41	1.044	
CLEANING CAR	lt / week	4	1	7	-	1	14	
OTHER USES	lt / week	2	0	2	0	1	5	
TOTAL LITERS PER WEEK (calculated)	lt / week	2.181	509	1.286	9	302	4.287	
COST PER WEEK (declared)	LBP /HH/ week	3.607	4.078	2.956	2.607	81	13.329	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	9,38	2,19	5,53	0,04	1,30	18,43	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	68,40	15,97	40,34	0,28	9,47	134,46	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	15.510	17.536	12.711	11.209	349	57.314	LBP /HH/ month
Willingness to pay:							27.262	LBP /HH/ month
Expected hourse of service:							4,08	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	74%	25.234	LBP /HH/ month
6 h/day:	19%	31.818	LBP /HH/ month
12 h/day:	2%	28.333	LBP /HH/ month
24 h/day:	5%	40.556	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE

n. of respondants: 28

area: Ain

condition 1: Households
condition 2: Network NO
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	-	9	21	7	15	52	
BATHING/ WASHING	lt / week	-	421	982	-	50	1.454	
CLEANING HOUSE	lt / week	-	210	730	-	25	965	
CLEANING VEGETABLE	lt / week	-	20	37	-	5	62	
COOKING	lt / week	-	18	43	5	8	74	
GARDENING	lt / week	-	-	302	-	-	302	
FLUSHING TOILET	lt / week	-	295	707	-	45	1.048	
CLEANING CAR	lt / week	-	-	20	-	-	20	
OTHER USES	lt / week	-	1	11	-	-	12	
TOTAL LITERS PER WEEK (calculated)	lt / week	-	974	2.854	13	148	3.988	
COST PER WEEK (declared)	LBP /HH/ week	-	6.179	7.625	3.304	-	17.107	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	-	4,19	12,27	0,05	0,64	17,15	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	-	30,54	89,50	0,40	4,65	125,09	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	-	26.568	32.788	14.205	-	73.561	LBP /HH/ month
Willingness to pay:							29.286	LBP /HH/ month
Expected hourse of service:							4,54	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	71%	27.500	LBP /HH/ month
6 h/day:	11%	36.667	LBP /HH/ month
12 h/day:	4%	50.000	LBP /HH/ month
24 h/day:	7%	20.000	LBP /HH/ month

Nabi Osmane

3.281 people

	water scheme 1st construction	renewal or rehabilitation	notes
d_Nabi Osmane	1970	2004	almost all the municipality is covered

	area	cond1	cond2	cond3	cond4	sample	m3/month	l/pers/day	exp/month	WTP/month	avg h/serv	2h-%	6h-%	12h-%	24h-%	WTP-2h	WTP-6h	WTP-12h	WTP-24h
17	Nabi Osmane	-	-	-	-	60	16,6	121	62.446	29.833	6,53	52%	12%	7%	12%	32.581	37.143	50.000	45.714
18	Nabi Osmane	Households	-	-	-	60	16,6	121	62.446	29.833	6,53	52%	12%	7%	12%	32.581	37.143	50.000	45.714
19	Nabi Osmane	Households	Network-YES	-	-	18	16,3	119	66.970	30.000	4,22	78%	11%	6%	6%	25.714	50.000	60.000	20.000
20	Nabi Osmane	Households	Network-NO	-	-	42	16,7	122	60.507	29.762	7,87	40%	12%	7%	14%	38.235	32.000	46.667	50.000

AVG CONSUMPTION / COSTS TABLE

n. of respondants: 60

area: Nabi Osmane

condition 1: Households
condition 2:
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	5	3	9	6	21	44	
BATHING/ WASHING	lt / week	118	283	655	-	152	1.208	
CLEANING HOUSE	lt / week	75	146	410	-	122	753	
CLEANING VEGETABLE	lt / week	10	16	38	1	7	71	
COOKING	lt / week	9	2	27	2	7	47	
GARDENING	lt / week	-	12	664	-	223	898	
FLUSHING TOILET	lt / week	119	206	354	-	92	770	
CLEANING CAR	lt / week	3	5	43	-	8	59	
OTHER USES	lt / week	3	3	-	-	1	7	
TOTAL LITERS PER WEEK (calculated)	lt / week	342	677	2.200	9	631	3.859	
COST PER WEEK (declared)	LBP /HH/ week	1.097	5.192	6.350	1.758	125	14.522	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	1,47	2,91	9,46	0,04	2,71	16,59	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	10,71	21,23	69,00	0,28	19,80	121,02	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	4.719	22.324	27.305	7.561	538	62.446	LBP /HH/ month
Willingness to pay:							29.833	LBP /HH/ month
Expected hourse of service:							6,53	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	52%	32.581	LBP /HH/ month
6 h/day:	12%	37.143	LBP /HH/ month
12 h/day:	7%	50.000	LBP /HH/ month
24 h/day:	12%	45.714	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE

n. of respondants: 18

area: Nabi Osmane

condition 1: Households
condition 2: Network YES
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	17	9	2	3	16	47	
BATHING/ WASHING	lt / week	394	583	56	-	206	1.239	
CLEANING HOUSE	lt / week	250	263	28	-	178	718	
CLEANING VEGETABLE	lt / week	32	38	1	-	7	78	
COOKING	lt / week	24	5	1	3	4	37	
GARDENING	lt / week	-	-	28	-	556	583	
FLUSHING TOILET	lt / week	396	456	56	-	133	1.041	
CLEANING CAR	lt / week	11	17	-	-	-	28	
OTHER USES	lt / week	9	6	-	-	-	15	
TOTAL LITERS PER WEEK (calculated)	lt / week	1.133	1.377	171	6	1.099	3.786	
COST PER WEEK (declared)	LBP /HH/ week	3.658	10.639	278	1.000	-	15.575	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	4,87	5,92	0,73	0,03	4,73	16,28	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	35,54	43,20	5,35	0,20	34,47	118,75	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	15.729	45.747	1.194	4.300	-	66.970	LBP /HH/ month
Willingness to pay:							30.000	LBP /HH/ month
Expected hourse of service:							4,22	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	78%	25.714	LBP /HH/ month
6 h/day:	11%	50.000	LBP /HH/ month
12 h/day:	6%	60.000	LBP /HH/ month
24 h/day:	6%	20.000	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE

n. of respondants: 42

area: Nabi Osmane

condition 1: Households
condition 2: Network NO
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	-	-	12	7	23	42	
BATHING/ WASHING	lt / week	-	155	912	-	129	1.195	
CLEANING HOUSE	lt / week	-	96	574	-	98	768	
CLEANING VEGETABLE	lt / week	-	7	54	1	7	69	
COOKING	lt / week	2	0	39	2	8	52	
GARDENING	lt / week	-	17	937	-	80	1.033	
FLUSHING TOILET	lt / week	-	99	481	-	74	654	
CLEANING CAR	lt / week	-	-	61	-	12	73	
OTHER USES	lt / week	-	2	-	-	1	3	
TOTAL LITERS PER WEEK (calculated)	lt / week	2	377	3.070	10	431	3.889	
COST PER WEEK (declared)	LBP /HH/ week	-	2.857	8.952	2.083	179	14.071	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	0,01	1,62	13,20	0,04	1,85	16,72	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	0,07	11,81	96,28	0,31	13,51	121,99	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	-	12.286	38.495	8.958	768	60.507	LBP /HH/ month
Willingness to pay:							29.762	LBP /HH/ month
Expected hourse of service:							7,87	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	40%	38.235	LBP /HH/ month
6 h/day:	12%	32.000	LBP /HH/ month
12 h/day:	7%	46.667	LBP /HH/ month
24 h/day:	14%	50.000	LBP /HH/ month

Labwe

6.277 people

	water scheme 1st construction	renewal or rehabilitation	notes
e_Labwe	1970	2010	almost all the municipality is covered

	area	cond1	cond2	cond3	cond4	sample	m3/month	l/pers/day	exp/month	WTP/month	avg h/serv	2h-%	6h-%	12h-%	24h-%	WTP-2h	WTP-6h	WTP-12h	WTP-24h
21	Labwe	-	-	-	-	204	22,5	164	95.746	29.265	3,56	64%	19%	1%	2%	26.769	36.154	40.000	37.500
22	Labwe	Households	-	-	-	170	21,1	154	78.911	29.118	3,49	75%	21%	1%	2%	26.772	36.944	35.000	37.500
23	Labwe	Households	Network-YES	-	-	142	20,3	148	83.524	28.944	3,60	73%	23%	1%	3%	26.731	35.313	50.000	37.500
24	Labwe	Households	Network-NO	-	-	28	24,8	181	55.516	30.000	2,93	82%	14%	4%	0%	26.957	50.000	20.000	-

AVG CONSUMPTION / COSTS TABLE

n. of respondants: 170

area: Labwe

condition 1: Households
condition 2:
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	16	8	9	17	10	59	
BATHING/ WASHING	lt / week	321	490	795	-	235	1.841	
CLEANING HOUSE	lt / week	178	237	374	-	138	927	
CLEANING VEGETABLE	lt / week	17	17	35	0	11	81	
COOKING	lt / week	28	14	27	9	16	94	
GARDENING	lt / week	25	124	260	-	323	732	
FLUSHING TOILET	lt / week	196	345	466	-	142	1.148	
CLEANING CAR	lt / week	-	0	10	-	3	14	
OTHER USES	lt / week	0	1	1	-	0	2	
TOTAL LITERS PER WEEK (calculated)	lt / week	780	1.237	1.977	26	877	4.898	
COST PER WEEK (declared)	LBP /HH/ week	1.692	5.692	5.584	5.137	247	18.351	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	3,35	5,32	8,50	0,11	3,77	21,06	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	24,46	38,81	62,02	0,82	27,52	153,63	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	7.275	24.475	24.010	22.088	1.062	78.911	LBP /HH/ month
Willingness to pay:							29.118	LBP /HH/ month
Expected hourse of service:							3,49	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	75%	26.772	LBP /HH/ month
6 h/day:	21%	36.944	LBP /HH/ month
12 h/day:	1%	35.000	LBP /HH/ month
24 h/day:	2%	37.500	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE

n. of respondants: 34

area: Labwe

condition 1: Commercial + Public Services
condition 2:
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	17	218	16	31	24	306	
BATHING/ WASHING	lt / week	24	140	632	-	234	1.029	
CLEANING HOUSE	lt / week	20	748	257	0	273	1.299	
CLEANING VEGETABLE	lt / week	-	-	-	-	-	-	
COOKING	lt / week	18	34	619	33	41	746	
GARDENING	lt / week	-	21	1.471	-	118	1.609	
FLUSHING TOILET	lt / week	50	740	497	-	261	1.548	
CLEANING CAR	lt / week	-	-	59	-	294	353	
OTHER USES	lt / week	-	16	3	-	-	19	
TOTAL LITERS PER WEEK (calculated)	lt / week	129	1.916	3.554	64	1.245	6.909	
COST PER WEEK (declared)	LBP /HH/ week	368	11.382	7.431	10.397	12.265	41.842	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	0,55	8,24	15,28	0,28	5,35	29,71	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	4,05	60,11	111,46	2,02	39,04	216,68	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	1.581	48.944	31.952	44.707	52.738	179.922	LBP /HH/ month
Willingness to pay:							30.000	LBP /HH/ month
Expected hourse of service:							5,14	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	9%	26.667	LBP /HH/ month
6 h/day:	9%	26.667	LBP /HH/ month
12 h/day:	3%	50.000	LBP /HH/ month
24 h/day:	0%	-	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE

n. of respondants: 142

area: Labwe

condition 1: Households
condition 2: Network YES
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	19	7	9	17	8	60	
BATHING/ WASHING	lt / week	384	468	785	-	151	1.788	
CLEANING HOUSE	lt / week	213	230	372	-	79	894	
CLEANING VEGETABLE	lt / week	21	16	35	0	5	77	
COOKING	lt / week	34	16	27	8	12	97	
GARDENING	lt / week	30	144	280	-	182	636	
FLUSHING TOILET	lt / week	234	352	470	-	104	1.160	
CLEANING CAR	lt / week	-	0	12	-	0	13	
OTHER USES	lt / week	0	1	1	-	-	2	
TOTAL LITERS PER WEEK (calculated)	lt / week	934	1.234	1.991	26	542	4.727	
COST PER WEEK (declared)	LBP /HH/ week	2.025	5.969	6.167	5.086	176	19.424	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	4,02	5,31	8,56	0,11	2,33	20,33	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	29,29	38,72	62,45	0,81	17,00	148,26	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	8.709	25.667	26.519	21.871	757	83.524	LBP /HH/ month
Willingness to pay:							28.944	LBP /HH/ month
Expected hourse of service:							3,60	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	73%	26.731	LBP /HH/ month
6 h/day:	23%	35.313	LBP /HH/ month
12 h/day:	1%	50.000	LBP /HH/ month
24 h/day:	3%	37.500	LBP /HH/ month

AVG CONSUMPTION / COSTS TABLE

n. of respondants: 28

area: Labwe

condition 1: Households
condition 2: Network NO
condition 3:
condition 4:

Consumptions per week	unit	NETWORK	TRUCKED WATER	PRIVATE WELL	BOTTLED WATER	OTHER SOURCE	TOTAL (calculated)	
DRINKING	lt / week	-	13	8	18	19	57	
BATHING/ WASHING	lt / week	-	600	848	-	661	2.109	
CLEANING HOUSE	lt / week	-	271	385	-	436	1.093	
CLEANING VEGETABLE	lt / week	-	23	34	-	43	101	
COOKING	lt / week	-	9	26	9	35	79	
GARDENING	lt / week	-	27	161	-	1.036	1.223	
FLUSHING TOILET	lt / week	-	309	446	-	330	1.085	
CLEANING CAR	lt / week	-	-	1	-	18	19	
OTHER USES	lt / week	-	1	-	-	0	2	
TOTAL LITERS PER WEEK (calculated)	lt / week	-	1.253	1.909	27	2.578	5.766	
COST PER WEEK (declared)	LBP /HH/ week	-	4.286	2.625	5.393	607	12.911	
TOTAL m3 PER MONTH (4,3 weeks -calculated)	m3 /HH/ month	-	5,39	8,21	0,12	11,09	24,80	m3 /HH/ month
Total liter per person per day (4,57 per HH - Calculated)	lt /pers/ day	-	39,29	59,86	0,84	80,86	180,85	liters /pers/ day
TOTAL COST PER MONTH per HH (Calculated)	LBP /HH/ month	-	18.429	11.288	23.189	2.611	55.516	LBP /HH/ month
Willingness to pay:							30.000	LBP /HH/ month
Expected hourse of service:							2,93	h / day

Willingness to pay in relation to different hours of service			
2 h/day:	82%	26.957	LBP /HH/ month
6 h/day:	14%	50.000	LBP /HH/ month
12 h/day:	4%	20.000	LBP /HH/ month
24 h/day:	0%	-	LBP /HH/ month

5.4 Links to additional web annexes

Annex web 1 - *Annotated literature review*

http://www.gvc-italia.org/images/documenti/ANNEXES%20PART%201%20-%20Annotated%20literature%20review.pdf

Annex web 2 - *Complete text of interviews for main actors' survey*

http://www.gvc-italia.org/images/documenti/ANNEXES%20PART%202%20%E2%80%93%20text%20of%20interviews%20-%20tables%20of%20analysis.pdf

Annex web 3 - *Complete analysis of citizens/customers' survey*

http://www.gvc-italia.org/images/documenti/ANNEXES%20PART%203%20%E2%80%93%20Complete%20Analysis%20Of%20Survey%20Data.pdf

An electronic version of the whole research is downloadable at the following link:

http://www.gvc-italia.org/info_1/download_2

If you need any additional information on this research, please contact:

gvc@gvc-italia.org

Public meeting between BWE Director and Municipality of Bejjeje-Jaboule

PART VI

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Works for increasing storage capacity of the network

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