REPUBLIC OF LEBANON
MINISTRY OF ENERGY AND WATER

UPDATED NATIONAL WATER SECTOR STRATEGY - 2020

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DAR AL HANDASAH NAZIH TALEB & PARTNERS
LIBANCONSULT AGM SAL Consulting Engineers
KREDO SAL

FOREWORD

The present volume is part of the ***Updated National Water Sector Strategy 2022***, which includes the following volumes:

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LIST OF ACRONYMS

Bm^3	Billion cubic meter
BMLWE	Beirut and Mount Lebanon Water Establishment
BWE	Bekaa Water Establishment
CDR	Council for Development and Reconstruction
CM	Customer Management
EIB	European Investment Bank
EU	European Union
HR	Human resources
IFRS	International Financial Reporting Standards
IWMI	International Water Management Institute
l/c/d	Litres per capita per day
l/sec	Litres per second
LBP	Lebanese Pound
LRA	Litani River Authority
m^3/d	Cubic meter per day
m^3/h	Cubic meter per hour
masl	Meters above sea level
MCM	Million cubic meter
MENA	Middle East and North Africa region
Mm^3	Million cubic meter
MoA	Ministry of Agriculture
MoE	Ministry of Environment
MoEW	Ministry of Energy and Water
NGO	Non-Governmental Organization
NLWE	North Lebanon Water Establishment
NRW	Non-Revenue Water (unaccounted-for water)
NWSS	National Water Sector Strategy

ONL	Office National du Litani
PPP	Private Public Partnership
SLWE	South Lebanon Water Establishment
UFW	Unaccounted for Water
UN	United Nations
WE	Water Establishment
WEs	Water Establishments
WES	Water Establishments

SECTION A
Strategy pillar – SDG6

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A.1. INTRODUCTION

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member Countries in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future.

It comprises 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries in a global partnership.

They recognize that improving water supply and sanitation for all, ending poverty, and other deprivations must go hand-in-hand with strategies and action plans that improve health and education, reduce inequality and spur economic growth, all while tackling climate change and working to preserve our oceans and forests.

The Department of Economic and Social Affairs (UNDESA) supports member states through capacity building for the SDGs and their related thematic issues such as water, energy, climate change, urbanization…etc. It also plays a vital role in the evaluation of UN system-wide implementation of the 2030 Agenda and on advocacy and outreach activities relating to the SDGs.

A.2. LEBANON'S ROLE REGARDING THE SDG IMPLEMENTATION

Lebanon has been an active participant in the process related to the SDGs. It first contributed through a report to the UN Conference on Sustainable Development, also known as Rio+20. Lebanon also participated in the national consultations to provide inputs during formulations of the SDGs, and, then, in the summits related to sustainable development and the SDGs. Lebanon endorsed the 2030 Agenda for Sustainable Development and the SDGs on September 2015.

In July 2018, Lebanon submitted its Voluntary National Review (VNR) at the High Level Political Forum, as part of the reporting mechanism of the 2030 Agenda. The VNR is a voluntary report which describes where countries stand vis-à-vis the 2030 Agenda, while sharing experiences and identifying successes, challenges and lessons learned.

In order to develop Lebanon's VNR and to support the general roll-out of the 2030 Agenda, the Council of Ministers established the National Committee (NC) on SDGs in November 2017 to coordinate national efforts on the SDGs, raise awareness, integrate the SDGs into national programs and plans, and contribute to the preparation of the VNR. The Government of Lebanon committed to developing a 2030 Vision, a 5-year implementation plan, and a monitoring and reporting plan that would focus on Lebanon's long-term development priorities, building on existing strategies and plans. The Deputy Prime Minister has been newly appointed as Chair of the NC on SDGs to lead the development of the 2030 Vision, the 5-year implementation plan, and the monitoring and reporting plan.

A.3. THE 17 SUSTAINABLE DEVELOPMENT GOALS

- SDG 1 End poverty in all its forms, everywhere
- SDG 2 End hunger, achieve food security and improved nutrition, and promote sustainable agriculture
- SDG 3 Ensure healthy lives and promote well-being for everyone at all ages
- SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- SDG 5 Achieve gender equality and empower all women and girls
- SDG 6 Ensure availability and sustainable management of water and sanitation for all
- SDG 7 Ensure access to affordable, reliable and sustainable, and modern energy for all
- SDG 8 Promote unrelenting, inclusive and sustainable economic growth, full and productive employment and decent work for all
- SDG 9 Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- SDG 10 Reduce inequality within and among countries
- SDG 11 Make cities and human settlements inclusive, safe, resilient and sustainable
- SDG 12 Ensure sustainable consumption and production patterns
- SDG 13 Take urgent actions to combat climate change and its impacts
- SDG 14 Conserve and protect the oceans, seas and marine resources through sustainable development
- SDG 15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and put an end to biodiversity loss
- SDG 16 Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- SDG 17 Strengthen the means of implementation and revitalize the global partnership for sustainable development

A.4. SDG 6: CLEAN WATER AND SANITATION FOR ALL

The Millennium Development Goals (MDGs) focusing on drinking water and basic sanitation is expanded in SDG 6 to include water, wastewater, water efficiency, water quality, Integrated Water Resources Management (IWRM), trans-boundary water cooperation and ecosystem resources. SDG 6 brought all these aspects together under one goal is an initial step toward address sector fragmentation and enabling coherent and sustainable management, thereby establishing SDG 6 as a major step towards a sustainable water future. Beyond SDG 6 water is also a significant factor for the achievement of many other SDGs.

Safe drinking water and adequate sanitation and hygiene are essential to human health and well-being. Water is needed for domestic, industrial, agricultural and tourism sectors. It is needed for food, energy and production uses that are highly interconnected and potentially conflicting. These uses generate wastewater, which may cause pollution if not properly managed. Water is also needed to ensure healthy ecosystems, which in turn can improve the quantity and quality of freshwater, as well as overall resilience to human-induced and environmentally induced changes. The effects of climate change are often seen in changes in water availability, such as increasing water scarcity in some regions and flooding in others. Consequently, water is a key factor in managing risks related to famine, disease epidemics, migration, and inequalities within and between countries, political instability and natural disasters.

Table A 1 SDG 6 Targets and Indicators

Target	***Indicator***
6.1. By 2030, achieve universal and equitable access to safe and affordable drinking water for all	*6.1.1. The proportion of population using safely managed drinking water services*
6.2. By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations	*6.2.1. The proportion of population using safely managed sanitation services and hand-washing facility with soap and water*
6.3. By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	*6.3.1. The proportion of wastewater safely treated* *6.3.2. Water Quality: proportion of bodies of water with good ambient water quality*
6.4. By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity	*6.4.1. The change in water use efficiency over time* *6.4.2. The level of water stress: freshwater withdrawal as a proportion of available freshwater resources*

Table A 1 SDG 6 Targets and Indicators

Target	Indicator
6.5 *By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate*	6.5.1. *The degree of integrated water resources management implementation (0-100)* 6.5.2. *The proportion of transboundary basin area with an operational arrangement of water cooperation*
6.6. *By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes*	6.6.1. *The change in the extent of water-related ecosystems over time.*
6. A. *By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies*	6. A.1. *The amount of water- and sanitation-related official development assistance that is part of a government coordinated spending plan.*
6.B. *Support and strengthen the participation of local communities in improving water and sanitation management*	6. B.1. *The proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management.*

Table A 2 Key SDG 6 Indicators regarding water and sanitation sector in Lebanon

Indicator	Explanation	Results
Improved water sources Piped improved sources	Improved water sources are those that have the potential to deliver safe water by nature of their design and construction.	99 % (2015) 83 % (2015)
Proportion of population using safely managed drinking water services	Drinking water from an improved water source is located on premises, available when needed, and free from faecal and priority chemical contamination.	37 % (2016)
Proportion of population using safely managed sanitation services	Use of improved sanitation facilities that are not shared with other households and where excreta are safely disposed of in situ or transported and treated offsite.	20 % (2015)

A.5. WATER INTERLINKED WITH OTHER SDG TARGETS

Water is either directly or indirectly mentioned in all the other SDGs. In particular, water is strongly related to the following goals:

- SDG 1 Target 1.4 By 2030, ensure that all men and women, in particular the poor and vulnerable, have access to basic services
- SDG 3 Target 3.3 Combat waterborne diseases
  Target 3.9 Reduce the number of deaths and illnesses from water pollution and contamination
- SDG 14 Target 14.1 Significantly reduce marine pollution, in particular from land-based activities
- SDG 11 Target 11.b Build cities with access to water and sanitation, and resilience to disasters (floods, storms, droughts)
- SDG 13 Target 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
- SDG 15 Target 15.1 Protect terrestrial and freshwater ecosystems, in particular wetlands

A.6. THE NATIONAL WATER SECTOR STRATEGY (NWSS) CONTRIBUTING TO SDGS

The Ministry of Environment (MoE) and the United Nations Development Programme (UNDP) in Lebanon shed the light on the linkages between "water" and the relation with SDG and Nationally Determined Contribution (NDC) Synchronization in a report produced in 2019. According to this report, the National Water Sector Strategy (NWSS) can contribute directly to:

- SDG 6 "Clean Water and Sanitation for All" through, for example, the following activities:
  - Optimized water resources through groundwater recharges and surface storage
  - Improved water quality by eliminating dumping and reducing the proportion of untreated wastewater
  - Revised and improved organization and institutional structures which will support the Integrated Water Resources Management approach
  - Policies and regulations which support measures that could increase water use efficiency

  Many activities and projects in the NWSS are all related to SDG 6.

Moreover, the NWSS also targets other highly relevant SDGs such as:

- SDG 1 No Poverty
  Improving resilience of the poor who are engaged in climate sensitive livelihoods through reducing the use of inputs by means of efficient measures (water efficiency and recycling, better soil management…etc.)

- SDG 3 Good Health and Well-Being
  Increased access to adequate sanitation and hygiene through efficient water treatment and sewage systems

- SDG 8 Decent Work and Economic Growth
  - Improving water efficiency through conservation initiatives in agriculture and industry
  - Contributing to decoupling growth from environmental degradation

- SDG 9 Industry, Innovation and Infrastructure
  - More efficient water transmission and distribution through improvements in the water infrastructure that supports economic development and human well-being
  - Conservation initiatives in industry and agriculture increases resources efficiency and supports adoption of environmentally sound technologies and processes

- SDG 11 Sustainable Cities and Communities
  Reducing the likelihood of water-related disasters through increased water quality and protection, and flood mitigation

- SDG 12 Responsible Consumption and Production
  - Groundwater recharge and increased surface water storage is an efficient use of natural resources
  - Reduction in use of inputs through efficiency measures (e.g., water efficiency and recycling, better soil management)
  - Public outreach, awareness and educational programs to promote industrial water conservation measures. Wastewater collection and treatment contributes to sustainable management and efficient use of natural resources

- SDG 15 Life on Land
  Combat desertification through improved water management

- SDG 16 Peace, Justice and Strong Institutions
  - Restructuring government entities to provide improved service delivery leads to more efficient and accountable institutions
  - Implementation and enactment of a water code supports the development of more transparent and accountable institutions

- SDG 17 Partnerships for the Goals
  - Improving operation and performance through restructuring delivery of services and strengthening of law leads to improved policy coherence
  - Policy coherence is achieved through a strengthened legal framework to improve the performance of service delivery.

SECTION B

Current legal and Institutional frameworks of the water sector

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B.1. LEGAL FRAMEWORK

B. 1.1 THE LAWS GOVERNING THE WATER SECTOR

Water has always constituted one of the major socioeconomic problems in the Middle East both due to its scarcity and its special role in the development of nations. Therefore, the organization of the water sector was important in order to allow an equitable and rational utilization of water resources as well as to provide a reference for water users.

Water in Lebanon is governed by several legislations that cover various aspects relating to the sector.

1. Customs ("*us et coutumes*")
   The development of society required individuals to abide by a number of rules for the periodic distribution of water to all those concerned. The rules, which the passage of time had slowly forged, were recognized by the legislator as customs.

2. The Ottoman Megelle
   Published as of 1876, it is in reality a vast compilation drawn from the Napoleonic Code, the customs of Middle Eastern countries, and the Sharia. Although it has been progressively repealed in Lebanon since 1920 by the enactment of various legislative texts, some of its provisions remain in force. The parts of the Megelle still in force in relation to water are Title 4, Chapter 10, Articles 1234 to 1328, which have not been repealed by subsequent legislation.

   There is, in addition, a short text entitled the Irrigation Code, dated 18 Rabih Al-Awwal 1332 (11 February 1913). Another law dating from March 1918 relates to the arrangement and renovation of common irrigation canals. These texts must be abolished and replaced by new legislation.

3. Decree-Law ("*Arrêté-loi*") 144 of 10 June 1925
   Relating to the public domain and Decree-Law ("*Arrêté-loi*") 320 of 26 May 1926 relating to the protection and utilization of public waters constitute the fundamental texts governing the water sector in Lebanon. These texts have undergone minor amendments since their promulgation, although their original underlying principles have not been altered.

4. At the same time as these fundamental laws were enacted, several decrees were promulgated to regulate some aspects of the water law, such as Decree 14438 of 2 May 1970 concerning the prospection and utilization of underground water and Decree 65 of 1942 relating to the creation of the water users' association of Nahr El-Jaouz (to the north of Batroun).

5. The Water Code promulgated by Law 77 dated 13 April 2018.

6. The Criminal Code provides in Articles 745 to 749 a certain number of penalties in case of infringement on water resources.

B. 1.2 CUSTOMS

The Ottoman conquest of the Middle East in 1516 resulted in the establishment of a relative political stability under a single authority and the creation of the principality of Mount Lebanon.

In the then-rural society, the development of agriculture called for individuals to respect certain rules both for the conservation of property and for the periodic distribution of water among all concerned, in order to avoid clashes and conflicts of interest and to ensure that everyone's water needs were met. These elements were established over time and with the agreement of successive generations and were recognized by the legislator as customs that historical and sociological studies in Lebanon are increasingly highlighting, demonstrating the continuous and permanent nature of their application in rural areas. Therefore, the question of the rotation of water use was a sign of social wisdom among all the partners concerned, a periodicity by which all had to abide because it had been the object of voluntary and continuous agreement in the locality. Consequently, and in the absence of written provisions, customs became the basis of unwritten legislation that legislators merely enshrined as of the 19th century and especially in the 20th century, by recognizing their force of law.

In practice, these rural societies had agreed to incorporate water into the transfer of property. However, during the 19th century, some transfer deeds were related to the transfer of property without the water, probably as a result of the added value of this product, which the owner wanted to keep for his own operation. This flexibility of customs regarding the transfer of water ownership clearly reflects the practical wisdom of a rural society where advanced legal conceptualizations could have devised many obstacles to the transfer of a property without the water.

As for rotation, it was calculated over a period of twelve or twenty-four hours depending on the villages and acquired customs that are still in force in villages today, as shown by recent sociological studies. As such, villages, families and farmers agreed on water use rotations that were generally related to the water needs pertaining to their property.

It is worth noting that the quantitative system in the rural world deserves some clarification because the current metric systems have caused the units of measurement relevant to the realm of plants and animals to fall into oblivion or obsolescence. Yet, the property deeds that are currently duly recorded in the land register still mention these units of measurement, hence the importance of providing their current equivalents for legal and practical reasons.

The units of measurement of length used were, thus, as follows[1]:

Habbat Cha'ir (oat seed)	4.71 mm	*Ba'* (4 *draa*)	2.17 m
Isba' (finger)	2.82 cm	*Mil hachimi* (1,000 ba') (mile)	2.71 km
Qabda (4 *isba'*) (fist)	11.89 cm	*Farsakh* (3 *mil*)	8.13 km
Dra (6 *qabda*) (pic)	67.75 cm	*Berid* (4 *farsakh*)	32.52 km
Dra' mi'mari (construction pic)	75 cm		

B. 1.3 THE MEGELLE CODE

The Megelle Code published between 1870 and 1876 is, in fact, a vast compilation drawn from the Napoleonic Code, the customs of Middle Eastern countries and the Islamic Sharia. It was gradually

[1] The Bachir Almanac, 1908, XXXth Year, Imprimerie Catholique, Beirut

repealed in Lebanon as of 1920 due to the promulgation of various legislative texts, but some of its provisions have remained in force. This applies to Title IV of Book 10 - Chapters 1, 2, 3, 4 (Articles 1234 to 1269), Articles 1281 to 1291 relating to the protection perimeter of wells, and Articles 1321 to 1328 relating to the dredging of watercourses.

B. 1.3.1 Definition of waters

Article 1234 of the Megelle Code defines water as a non-trade commodity to which everyone has a right (mubah). Groundwater is also covered by res nullius (Article 1235).

This character of common, non-trade property is attributed to unappropriated running water and to water from wells dug by an undetermined person, as well as to the sea and large lakes (Article 1236). Seas and large lakes are also non-commercial bodies, such as "basins in and outside Beirut's souks" (Article 1237).

Waterways fall into two categories:

1. Public domain waterways, the bed of which cannot be privately owned, such as the Nile, the Euphrates, the Danube, and the Don (Article 1238).
2. Private waterways that flow through privately-owned lands and take the shape of: (a) private waterways that flow through several private properties and into public rivers; (b) canals that flow, deplete and terminate in these private lands without leaving them to form another confluence (Article 1239 – 2nd).

B. 1.3.2 Utilization of water

Modes of utilization of the rights to use water are recognized either by statutes or by the continuous exercise of a right of use. The Ottoman Megelle, while recognizing the right of all to use water on the condition of not infringing the rights of others (Art. 1254), identified two methods of using water.

The first was the right for cattle to drink and for land to be irrigated (Art. 1262). This is called, following the Islamic law tradition, *haqq-al-shirb*. Every person is allowed to irrigate their lands from public watercourses and to dig a channel for this purpose on condition that the rights of other persons are not infringed upon, as in provoking flooding, draining water totally, or preventing navigation where it was previously possible (Art. 1265). Every person is also permitted to provide water to their animals on condition that their great number does not cause damage to the property (Art. 1267).

Every person in full ownership of water in the form of wells and streams, among others, is, however, allowed to prohibit another's *haqq-al-shirb*, if another water source is available for public use in the area. If such is not the case, the owner is obliged to grant the person concerned the right to access their land and take the required amount of water, without damaging the edges of the well, the basin or the stream (Art. 1268).

Finally, a co-owner of a waterway is prohibited from digging a private channel without the authorization of other owners. He is also prohibited from changing the traditional periodicity of irrigation and from transferring water to land belonging to him but not benefiting from irrigation rights from the waterway in question. In this case, Art. 1269 expressly provides that any consent otherwise given by the co-owners can be withdrawn by them or their heirs at any time.

The other traditional right consecrated by the Ottoman Megelle is "*the right to drink water*", or *haqq-al-shafa* (Art. 1267). Every person has an absolute right to drink and can also carry water for their garden and their family in a small receptacle.

B. 1.3.3 Maintenance of waterways

The dredging of waterways is regulated by Articles 1321 to 1326 of the Megelle Code.

The State is responsible for the dredging of public domain rivers However, if the State is in a poor financial situation, the dredging costs are to be borne by private individuals (Article 1321).

The dredging of private waterways is the responsibility of owners who have the right to water their fields and to have their livestock drink from these waterways. Those who only have the right to drink from these waterways do not contribute to the dredging (Article 1322).

It is worth considering the case where a number of people with the haqq-al-shirb right (to irrigate or water) on a common waterway, want to clean it, while the other beneficiaries oppose this decision. In the case of a public waterway, all beneficiaries are required to clean it jointly. If the waterway is a private one, those who clean it, after obtaining the authorization of the water administrator, may prevent other members of the community from exercising their right to water until they pay their share of the expenses (Article 1323).

When all persons having the haqq-al-shirb right over a common waterway refuse to dredge it, Article 1234 of the Megelle states that they may be forced to do so if it is a public waterway, but not if it is a private one (Article 1324).

"The task of cleaning a waterway begins upstream. All members of the community must first contribute to the dredging costs. Once the portion of the waterway that flows through the property of the resident located furthest upstream has been cleaned, the resident is no longer required to contribute to the dredging loads, and so on until downstream. Everyone must contribute to the expenses proportionally to the usefulness they derive from them" (Article 1326).

In conclusion, the legal framework related to water arising from customs, the Ottoman Megelle and acquired rights to water was established over nearly four centuries of Lebanon's political and economic history, while not entirely repealed by subsequent laws. Thus comes the explanation of why the legislative texts currently in force have incorporated or recognized many principles and acquired situations.

B. 1.4 WATER LAW IN LEBANON

B. 1.4.1 The Water Code

The Water Code promulgated by Law 77, dated 13/4/2018, represents a substantial effort to modernize the legal, financial and institutional aspects of the water sector. Even though the major articles of this Code have yet to be implemented, a draft to have it amended has been submitted to Parliament.

B. 1.4.2 The main aspects of the Water Code

The Water Code (Law 77/2018) represents an upgrade for the existing legislation in the following aspects:

- It recognizes the main legal principles currently prevailing with regard to water such as (i) sustainable management (Art. 4); (ii) the right of each citizen to receive water (Art. 5); (iii) the determination of the missions of public authorities to provide drinking water, treat wastewater, the water for irrigation, and fight against floods (Art. 91), drought (Art. 93) and pollution.
- It recognizes the legal status of water, including the legal elements of the water public domain, watercourses, underground waters, dams, etc.
- It puts into effect the water register allowing public authorities to draw up an adequate and updated inventory of water resources (Art. 13).
- It underlies the establishment of a national water council in which the main authorities in connection with the water sector are represented (Art. 14 and 15).
- It enforces a water master plan to guarantee the realization of water works and projects (Art. 17 and 18) and handle their legal impacts (Art. 20).
- It defines the legal schemes of water basins (Art. 22 to 24).
- It outlines the founding principles of the agreements regarding the sustainable management of the water sector (Art. 25).
- It identifies the institutional, environmental, economic and financial requirements to ensure efficient management of water resources, including tariffs, financial compensation in case of water pollution, etc. (Title 4)
- It identifies new tools to manage the water sector, including the legal possibilities for a public-private partnership (PPP) (Title 5).
- It outlines the principles pertaining to the establishment of a water users' association to promote irrigation (Art. 77 to 83).

B. 1.4.3 The opportunities offered by Law 77/2018 for a PPP

The options offered by the Lebanese law for the management of a public service are diverse. Apart from direct management by the State and by public establishments, the law allows the application of two delegated systems of management

B. 1.4.4 Direct management

Though not as widespread as it used to be, direct management remains one of the legal options offered by law to administrative authorities through resorting to the budget, as planned and approved by Parliament.

B. 1.4.5 Delegated management

1. Public establishment

   This applies to all water authorities according to the 221/2000, which merged them all into four authorities and to paragraph 1 of Article 62 of law 77/2018.

2. Build Operate Transfer (BOT) or Design Build Operate Transfer (DBOT)

   The provisions of paragraph 2 of Article 62 of Law 77/2018 provide the possibility to implement a delegated system of management in cooperation with the private sector taking the legal structure of the BOT or DBOT.

B. 1.4.6 The Public Private Partnership Law

The law 48 promulgated on 7/9/2017 and related to the organization of the PPP covers all the joint projects implemented by the administration, the public establishments and others, except for the Municipalities and the Federation of Municipalities (Article 1).

B. 1.4.7 The General Legal Regime

According to Article 1 of Decree 144/1925, the general principle concerning water resources in Lebanon is that title belongs to the State by virtue of its being "public domain" property. There are, at the same time, some important exceptions.

Article 2 of the same decree determines state ownership of the public domain as follows:

- The marine shore until the upper reach of the waves in winter and the sand and pebble beaches;
- Bays and great salted lakes directly connected to the sea;
- Rivers;
- Underground water and water sources of any type;
- Watercourse sides, namely the land all along waterways necessary to protect and clean them;
- Waterfalls capable of producing energy.

It thus appears that the legislator granted the State full ownership of water resources on the Lebanese territory, with respect to the protection and the utilization of public water.

Article 1 of Decree 9132, dated October 1974, specified that the marine shelf of territorial waters also comes under the public domain and all land adjacent to the sea can be declared part of the public domain by decision of the Council of Ministers upon the proposal of the Minister of Public Works.

B. 1.4.8 Exceptions to the Public Domain Principle

Taking into account the provisions of the Arrêté Law 144/1925, the exception to the general principle of the public domain is the following:

B. 1.4.9 Water rights

The legislator recognized acquired rights on waters in Decree 320 of 26 May 1926. While conceding to the State, and, thus, to the public domain, exclusive property over water resources, the legislator

established a certain number of everyday rules of possession and of water use as established by tradition. This major exception was provided in Article 3 of Decree 144 of 10 June 1925: “Persons having over the public domain rights of ownership or of use pursuant to the old traditions or to established legal documents before the entry into force of this decree shall obtain prior equitable compensation if their rights are recovered for reasons of necessity for public use.”

This compensation, unless submitted to an administrative tribunal, is evaluated by a commission made up of three people: one designated by the President of the Republic, the second by the concerned owner, and the third by common accord between the President of the Republic and the concerned owner. If the owner does not designate their representative within one month from receiving the notice and if no agreement is reached with respect to the designation of the third person, the Minister of Justice shall designate these two persons.

As such, every person capable of proving the existence of rights prior to 10 June 1925 holds an acquired right to water, which cannot be taken away from them except by equitable compensation. These acquired rights on water are recorded in the Land Register and are, of course, transferable by sale or inheritance. Their importance cannot be sufficiently underlined, and courts have consistently recognized in this area the responsibility of the State in the protection of acquired rights to water.

B. 1.4.10 Rainfall and spring water

Article 60 of the Property Code dated 12 November 1939 provided that rainfall and spring water originating from land are recognized as a right for the landlord to use on condition that they respect the rights of third parties.

Article 3 of Decree 320/26 exempted from any authorization or permit the use of water from wells drilled on private property, the flow of which does not exceed 100 cubic meters per day, on condition that this water does not come in a surreptitious manner from a river or a source.

B. 1.4.11 Permits

Decree 320/26 (Titles 2 and 3, Articles 4 to 20) set out specific provisions with respect to the issuance of permits for use and the issuance of concessions. As for scope, the following elements are subjected to temporary occupation by decree issued by the Head of State or any other authority to which he would delegate such power: temporary erection of structures for the use of public domain waters; extraction of all sorts of materials from a permanent or seasonal waterway, from lagoons, swamps, etc.; installation of deposits, planting of trees and cultivation of the land on the sides of waterways, lagoons, swamps, etc.; prospecting for and channelling of underground or spring water, but not using thereof; structures intended for the control and use of water from natural sources, the flow of which is not sufficient to justify its need for public use; cleansing and draining of permanent or seasonal waterways.

The permit sets out conditions required by the public authorities that must be met by the permit holder (Art. 5). In the case of underground water, the permit determines the scope and acceptable means of prospecting, the samples that the prospector must submit to the Administration and the forms of control. In addition, the scope and nature of the work, the materials to be used and the overall management must be well-defined where the permit concerns civil engineering works on waterways.

The duration of the permit is determined by the permit itself. However, pursuant to Article 7 of Decree 320/26, the following are granted for temporary use not exceeding four years: permanent pumping of water from a waterway; irrigation of lands using public domain waters by motorized methods or the use of such water for energy; use of underground and spring water; use of hot and mineral springs; purification and development of marshes. It should be noted, here, that paragraph 2 of Article 10 of Decree 320/26 specifies that if a permit for water use is issued to a farmer, it may be renewed indefinitely for successive periods of forty years.

The above-listed uses covered by Article 7 may be declared of public use and thus subjected to the specific regulations of concessions. In such cases, their length cannot exceed 75 years (Art. 12). Article 18 of Decree 320/26 granted the concessionary or the holder of a permit lasting over one year the right to certain easements, including: the right to occupy private property to the extent necessary for the channelling of water and enforcement of banks and the right to submerge the banks to raise the water level and to flood the lands in order to establish water reservoirs. These easements do not apply, however, to structures, places and lands adjacent to dwelling houses. In addition, equitable and justifiable compensation must be provided for and paid to the eligible parties. The payment of compensation to eligible parties in exchange for the right to acquire private rights to water and to sources can be done in money or in kind (Art. 20 par.1). In the event of disagreement, administrative tribunals are called upon to make a final decision and the judge is asked to reconcile the interests of eligible parties with those of the concession (Art. 20 par.6).

An exception under Article 3 of Decree 320/26 exempts from any authorization or permit the use of water from wells drilled on private property, the flow of which does not exceed 100 cubic meters per day, on condition that this water does not come in a surreptitious manner from a river or a source.

B. 1.4.12 Priorities

The requirements of socio-economic development call for identifying priorities regarding the use of water. This is obviously due to its scarcity and to the important financial investments required for the development of hydraulic infrastructures.

B. 1.4.13 Regulation of Water Pollution

To date, the control of water pollution is governed by the provisions of Arrêté 52/B issued by the Minister of the Environment on 29 July 1996 which, in Annexes 1 to 6, identified the standards applicable to water intended for human consumption (Annex 1), the quality requirements for surface fresh water used or intended to be used for the production of water for human consumption (Annex 2), the quality of water required for aquatic life (Annex 3), the quality requirements for swimming waters: rivers, lakes and seas (Annex 4), urban wastewater characteristics (Annex 5), and the minimum quality level of a predominantly domestic discharge (Annex 6). These standards are in fact only a reproduction of international or European Union provisions that would undoubtedly deserve to be tested in the context of the Lebanese environment.

B. 1.4.14 Domestic and Municipal Use

Domestic use of water and its supply to each household have been the object of sustained attention by public authorities during the last 50 years. Yet, there is no specific legislation regarding the use of

domestic water except for the provisions of Title V (Art. 25 to 29) under Decree 320/26 concerning the delimitation by the Head of State of the space necessary for the hydraulic piping required for drinking water, the prohibition of planting trees in such spaces, and the compensation of claimants whose equipment constitutes an obstacle for the works.

Likewise, there are no specific texts regarding the municipal use of water, which remains subject to various general provisions pertaining to municipalities in general.

B. 1.4.15 Agricultural Use: the 1913 Ottoman Code

The agricultural use of water is regulated by the 1913 Ottoman Irrigation Code. This text which was manifestly mistranslated from Turkish into Arabic, does not follow any methodological or scientific approach, and merely enumerates the definitions and subdivisions of the irrigation system, the methods of irrigation and the penalties in place at the time. However incoherent, this text is still in force and has yet to be amended. This may be due to the fact that the Lebanese administration has never really initiated a large-scale irrigation project of any kind to elicit a deep revision of legal norms concerning irrigation. This old but still operative text, therefore, needs to be thoroughly redrafted.

Articles 1 to 8 of the 1913 Ottoman Irrigation Code define the various practical denominations of the irrigation system, which we continue to use under their original names in the absence of any translation. The irrigation system as defined in Art. 7 is constituted as follows: “The qanat (canal) is the watercourse which does not directly irrigate any land, but which carries water to other pipes or public fountains (Art. 1). The yadok is the first ramification of the canal (Art. 2). The khork is the first ramification of the yadok (Art. 3). The aghzalog (water connection) is the ramification of the khork flowing directly into a property.”

As for the water drainage system, it is subdivided as follows: “The khandak (pit) is the place where water is stored after the land is irrigated. The sawjak (diversion) is the ramification by which water flows into the khandak. The ayak (base) is the water pipe draining water out of the irrigated land (Art. 5). The ugh is the underground conduct used for land airing.”

Article 8 of the Code specifies that both the irrigation system and the elements, buildings, installations, and aqueducts, which play a role in the irrigation circuit, are public property and that the administration must regularly repair them. By contrast, all elements composing the drainage system or built by private owners are private property and users bear all the necessary expenses related to them.

The Ottoman law is, above all, a collection of local uses and customs, particularly in irrigation matters. The Articles of the Irrigation Code present, in a somewhat incoherent fashion, the concrete cases pertaining to irrigation.

For instance, the Code established that the owners of lower plots have a duty to accept the draining of water from upper plots whose owners have, in turn, the duty to compensate the former in case of damage (Art. 10). The Code also makes it impossible for any owner to prohibit the works necessary for setting an irrigation or drainage system when these works have been approved by the administrative authorities in charge (Art. 11). Furthermore, any damage suffered by a plot due to a system blockage must be compensated by the author of the damage (Art. 13). If a private individual must build an

irrigation or draining grid and finds themselves bound to encroach upon public property, then they must subject themselves to the prescribed legal norms relevant to such cases (Art. 15). Any person who wants to build a temporary or permanent canalization must first pay to the owners the value of their property, as well as compensate for the damage incurred to the property due to the works. When the owners grant a temporary right of passage for a period of less than nine years, the beneficiary must pay only half of the amount and retain, before the expiration of the nine-year period, the right to pay the second portion of the amount owed to convert this right of passage from temporary to definitive (Art. 16).

Private individuals who have no choice but to drain their water through a public aqueduct must pay the required compensation in the event of damage (Art. 18). The administration retains the right to grant to private individuals the permits needed to lay down the necessary water circuits. Third-party rights must, however, be preserved and the permit must be effectively honored (Art. 19).

The irrigation administration is always to be previously consulted in matters of works by other administrative services, and any permit granted will be subjected to its approval (Art. 21).

The reinforcement and cleaning of the water system are the responsibility of those who have laid it down or who benefit from it under the supervision of the water administration. However, if the number of owners is minimal or if they do not have the financial means to carry out the works, the administration can do it at their expense and reclaim its money at harvest time (Art. 28).

The March 1334 (1918) Act stated the provisions pertaining to the dredging and renovation of common canalization. Those who enjoy irrigation rights have the duty to clean and renovate common canalization and the administration has the right to determine each party's obligations in this respect (Art. 1 and 2), under pain of financial penalties (Art. 4).

Articles 32 to 37 mention a set of criminal and financial penalties, which vary from one to six months imprisonment and fines for all offenses related to the provisions of the Irrigation Code. As pointed out earlier, these penalties were never actually put into practice.

B. 1.4.16 Other water sectors

From a theoretical point of view, the autonomous water authorities are responsible for the distribution of water to households, seaside resorts and industries. However, due to ever-growing industry requirements, they often no longer satisfy demand in its entirety. The drilling of artesian wells to supply industry were undertaken, leading to serious depletion of the country's underground aquifers not to mention the need for strict pollution control to prevent the degradation of the environment in general. There are no mines in use in Lebanon nowadays and the search for mineral resources has stopped, but a piece of legislation going back to 9 August 1933 still purports to regulate the legal modes of the acquisition of mining prospector licenses.

Over the past 20 years, the water industry has grown as the market was flooded by several bottled water brands from high mountain sources. On top of the technical and hygienic requirements – provided, nowadays, in Decree-Law 108 of 16 September 1983 - Decree 144/25 also set the legal framework for these high mountain sources in two main ways. In the case of a person enjoying an acquired right over water and seeking to have it bottled, the Administration must ascertain the legality

of the claimant's rights over the water. If this condition is verified, the claimant has the right to bottle the high mountain source water from their property in accordance with the statutes in force. On the one hand, if a person merely enjoys a right of use of a water source, the extent of the claimant's rights before the publication of Decree 144/25 is examined. If this right is limited to irrigation only, it is deemed illegal to grant the claimant a water-bottling license. On the other hand, if it is verified that the claimant enjoys the right of sale and transport of the water, the Administration may grant them the right to bottle and commercialize the water.

As for navigation and transportation, the nature of rivers and the limited surface area of the country prevent any serious fluvial navigation or transport of goods by way of rivers, hence the lack of legislation in this area.

In contrast, the use of hydroelectric power has been the object of considerable works both by the Administration - for the Litani River and the Nahr El Bared River in the North - and the statutory companies, in particular the electricity company of Nahr Ibrahim - the Adonis River of ancient times. However, with the exception of the Litani River Authority which will be introduced in this chapter, there are no legislative texts concerning the technical and legal norms governing the execution of hydroelectric projects.

B. 1.4.17 The Water Industry

For more than thirty years, a variety of bottled water brands has been available on the market, some of which come from high mountain springs. Decree-Law 108 of 16 September 1983 was promulgated to monitor the sector in order to ensure that the water industry complies with scientific and health standards set for the good of society and the justification of the quality of distributed water.

This decree law was followed by Law 210, dated 30 march 2012, which ruled the treatment, bottling and selling of bottled drinking water.

B. 1.4.18 Provisions of Decree-Law 108/83

This decree-law identified the characteristics of the water proposed for consumption as well as the legal and sanitary conditions to be respected.

B. 1.4.19 Official denominations

Article 3 of Decree-Law 108/83 identified the various official water denominations as follows and prohibited the use of other denominations (Article 4 of the same decree-law).

1. Natural water is groundwater suitable for consumption, meeting the conditions laid down in Article 2 of Decree-Law 108/83 and gushing out at ground level, either naturally or artificially, via artesian wells or raised mechanically by water-cooled pumps.

   The decree-law strictly prohibits any treatment of this water, including sterilization, pasteurization or exposure to radiation. The only operation allowed is a closed physical operation that does not affect the original composition of the water at the source without the use of any chemicals.

   This water must be bottled at source and may also be transported to filling centers through closed pipes approved by the Ministry of Public Health.

2. Natural mineral water is water suitable for consumption, meeting the conditions of natural water, the specifications listed in Article 2 of Decree-Law 108/83 and the particularities that grant it sanitary or curative capacities, based on technical, geological, chemical, physical and biological studies. Research and experiments must be carried out over a period of at least one year.

3. Natural sparkling mineral water is a mineral water meeting the specifications of natural mineral water, while containing natural gas comparable in quantity to the gas existing in the water at source, taking into account technical losses.

4. Carbonated natural mineral water is a mineral water that meets the specifications of natural mineral water and contains CO2 from another source.

5. Drinking water or table water is water suitable for consumption, meeting all the conditions listed in Article 2 of Decree-Law 108/83, regardless of its source. The law authorizes the sterilization of this water by one of the recognized physical or chemical means or the removal of sterilization materials by any of the accepted technical means. This water was defined by article 1 of law 210, dated 30 march 2012, as clean water for consumers during a limited period.

6. Refreshers are a type of water that is safe to drink, just like drinking water or table water. Locally or internationally authorized natural or physical products are added to refreshers to colour, sweeten, preserve or flavour them. In this case, it is imperative to mention the names of the products and the quantities introduced on the label or on the bottle.

B. 1.4.20 Conditions to be met for any water intended for consumption

Article 2 of Decree-Law 108/83 state that all bottled water intended for consumption must comply with the following conditions:

- Be free of any disease-causing microbes or parasites.
- Be free of any flavour or odor resulting from changes in its natural, chemical or biological characteristics.
- Be free of rot or algae.
- The water colour must not exceed five units.
- Free from any suspended or surface deposits or products.
- The quantities of harmful or unacceptable products must not exceed the following maximum amounts in milligrams/litres:

Selenium	0.01	Chromium	0.01
Fluorine	1.00	Cyanides	0.01
Arsenic	0.05	Mineral oils	0
Nitrates	5.00	Pesticides	0
Mercury	0	Organic products	0
Cadmium	0.01		

B. 1.4.21 Administrative conditions

Article 1 of Decree-Law 108/83 made it mandatory for any applicant wishing to fill drinking water or refreshers in bottles or containers to obtain a license, which is granted by decree on a proposal from the Ministry of Public Health. Moreover, and according to articles 8 and 9 of law 210 dated 30 march 2012, specific conditions must be fulfilled in case of authorization to implement treatment and bottling industries by the ministries of Public Health and Industry without the possibility to amend the exploitation without a prior written authorization of the concerned ministries, under sanctions of lockout of the industry.

B. 1.4.22 Flood control

The Minister of Energy and Water is legally responsible for all matters related to water. However, there is no specific legislation on flood control. Any such action should normally be taken by any responsible authority. Article 9 of Decree 320/26 stipulated that when a permit for the temporary use of water in the public domain is granted, specific measures must be taken to prevent flooding and protect public health, on pain of revocation of the authorizations or concessions.

B. 1.4.23 Wastewater drainage

Decree 8735, dated 23 August 1974, regulated the disposal of waste water by specifying the following:

- It is prohibited to discharge waste water from residential buildings and commercial/industrial establishments in the public domain, maritime and inland waterways, or unfinished and unauthorized sewage systems. It is also strictly prohibited to discharge waste water into bottomless wells, and an owner who happened to have drilled such wells must have silt them up within one month from 23 August 1974 (Article 3). However, this requirement has never been fully implemented.
- Industrial establishments are required to filter wastewater before it is discharged (Article 4).
- It is prohibited to irrigate fruits and vegetables with wastewater which must not be kept uncovered (Article 4 of Decree 8735 of 23 August 1974).

B. 1.4.24 Underground Water

Give the right carried by third parties to extract and use ground water in Lebanon, and due to the gap in the implementation of a large range of water projects, groundwater prospecting is rather essential to agricultural production. Such a statement is particularly true in the areas insufficiently endowed with the necessary alternative resources or which are not the object of adequate development plans. Article 6 of Decree 320/26 established the possibility for citizens to prospect for underground water, provided that an application is submitted to the administration, which would in turn have four months to respond. The lack of a response would be equivalent to a rejection. Over time, however, surging demand for water and development requirements highlighted the need for specific legislation concerning groundwater prospecting. Decree 14438 of 2 May 1970 organizing the prospecting and use of underground water was, therefore, enacted. Although rapidly drafted and largely lacking any methodological scheme, this decree constitutes a first approach to the organization of underground water, as it regulates the granting of or exemption from prospection permits according to whether the

drilling depth is superior or inferior to 150 meters and according to the nature of underground water usage.

The Arrêté 118 of the Minister of Energy and Water, dated 13 September 2010 - taking into account, in its Recitals, the legal provisions of the Medjellé, the decree laws 144/1925 and 320/1926 and the decree 14438/1970 - implied the implementation of the administrative trend to obtain authorization in the field of underground water prospection.

The Code of Water includes in Title 3, Chapter 2, Articles 36 to 41 some provisions related to the permits of exploitation of the underground waters - submitting the enforcement of this chapter to proclaim a decree of implementation (Article 41) which has not been promulgated to-date. Nevertheless, we can point out that article 39 of the said Code requires a permit from the administration in case of exploitation of underground water, taking into account the provisions of decrees 144/1925 and 320/1926 (alinéa g of the articles) in case of infringement of the permit.

B. 1.4.25 In case the drilling depth is superior to 150 meters

For a prospecting permit allowing drilling beyond 150 meters, Article 2 of Decree 14438/70 provides that "it is prohibited to undertake prospecting works of underground or high source waters, to canalize them, or to drill wells before obtaining a preliminary permit". Article 4, paragraph 4 of Decree 14438/70 enumerated the documents which the applicant must present to the Ministry of Energy and Water (General Directorate of Equipment), including their name and address; the type, location and aim of the works; the Land Register certificate proving the applicant's right to dispose of the property; a land survey map on a 1/5000 or 1/500 scale depending on the importance of the works in surveyed regions and on a 1/1000 scale in the case of non-surveyed regions; and finally a detailed map of the envisaged works in the scale of 1/50 or 1/200.

After submitting the application, Article 5 of Decree 14438/70 specifies that the General Directorate of Equipment within the Ministry of Energy and Water should examine the file and advise the Minister on whether to grant the permit.

Article 6 of Decree 14438/70 stipulates that permits granted by decree on a proposal by the Minister of Energy and Water for a period of one year also determine the taxes to be paid by the applicant in accordance with Article 9 of the same Decree before its notification.

Article 10 of Decree 14438/70 pointed out that the permit must include the location, type and prospecting details as well as draining, instructions, samples, and analyses which the applicant must present to the Administration, in addition to the conditions of supervision of the drilling works.

B. 1.4.26 In case the drilling depth is inferior to 150 meters

Article 7 of Decree 14438/70 exempts applicants from obtaining a drilling permit on their private property in case the drilling depth is inferior to 150 meters. This does not mean, however, that the applicant is free to act with complete freedom, as the waiver of the permit is no more than an alleviation of the formalities required. In fact, this permit is replaced, according to Article 7 of Decree 14438/70, by the applicant having to notify the administration ahead of the envisaged works. This request is submitted to the Ministry of Energy and Water (General Directorate of Equipment) and must include all the aforementioned elements to obtain the permit (Article 8 of Decree 14438/70). An

acknowledgement of preliminary notification is subsequently sent to the applicant specifying the number, the request date and the prospecting location.

The use of underground, drainage or high source waters or water without specific origin resulting from drilling is governed by the idea of temporary occupation for a maximum period of four years (Article 11 of Decree 14438/70). This is conferred by a decree published in a proposal by the Minister of Energy and Water and specifying the taxes to be paid in pursuance of Article 15 of the Decree as well as the nature of use (Article 16). The decree must include information on the nature of use (irrigation, industry or other), the number and size of the properties concerned, the maximum authorized quantities, and the required equipment and installations, thus allowing the administration to control and measure the quantities of water used.

As mentioned earlier, Article 13 of Decree 14438/70 waived the requirement for a permit altogether in the case of a use of water by drilling on private property, provided that the quantity of water does not exceed 100 cubic meters per day and that the water does not directly come from a river or a water source. In this case, receipt of preliminary notification is the only requirement (Art.8).

Finally, Article 18 of Decree 14438/70 determined the penalties to which offenders expose themselves with reference to Art. 770 of the Penal Code: "Any breach of the regulations set by administrative or local authorities will be punished with imprisonment and a fine or with one of these two penalties."

B. 1.4.27 Water Users' Association

Water management also operates in theory on the level of water users. Title VI (Article 30 to 56) of Decree 320/26 mentions the possibility for owners to enter into a water partnership (Article 50) with a view to undertaking the following (Article 31): to protect themselves from temporary or permanent harm due to dangerous and unruly watercourses; to clean, deepen, straighten and manage temporary or permanent watercourses; to drain marshy and insalubrious lands; and to organize collective irrigation.

Some administrative requirements must be fulfilled in order to create such a partnership. A reasoned and detailed request addressed to the Head of State in the owners' name must specify the partnership area, the property status of each plot, the overall aim of the project, a concise summary and the costs of the projected works, as well as the foreseen means to pay for them (Article 32, Decree 320/26). After examination by the Ministry of Hydroelectric Resources and in the case of a favorable decision, the owners will be called to a general meeting including representatives of the ministries of Finance, Agriculture and Hydroelectric Resources. The owners or their agents must countersign the document authorizing the creation of this partnership, which can encompass - by special permission - town council heads. For the partnership to be legally incorporated, the owners must either possess a quarter of the value of the land or half of its surface, or half the owners must possess a quarter of the surface (Art. 35). Where the proposal of incorporation of a partnership is made by the Head of State for reasons of public health, the partnership can be merged whatever the result of the general meeting. The Decree provided for additional details, but the whole system is of little importance. Over a period of 60 years, only one partnership of water users has seen the light and was incorporated by Decree 65 of 19 August 1943 for the use of the Nahr El-Jaouz (Batroun) waters. Yet, its activities do not seem to have left a mark on the region.

Title 5- Chapter 4- articles 78 to 83 of the Code of Water (law 77/2018) provides specific provisions related to the Water Users' Association (WUA) and specifically:

- The possibility to establish a WUA (article 78).
- The activities of the WUA (article 79).
- The principles required in the activities of each WUA (article 80).
- The main goals to establish a WUA (article 81).

Nevertheless, the Code of Water has previewed the possibility to promulgate a decree of implementation in this field - and more specifically to establish the legal principles of the management of the WUA after amendments of the Title VI of decree law 320/1926.

On the international level, water and irrigation in Lebanon have attracted the interest of several international organizations and foreign states. In addition to the studies conducted under the so-called American Point IV between 1954 and 1957, UN specialized agencies - mainly UNDP, FAO and UNICEF - have promoted, taken part in, and often conducted studies and research in hydraulic matters in the country.

B. 1.4.28 Water Policing

Water policing and the conservation of water resources are a major area of intervention by the authorities in the context of protecting water resources for the benefit of citizens. Decree 320/1926 presented two cases of water policing situations, the first prohibiting citizens from any act likely to harm the resource without the authorization of the administration and the second being a case of absolute prohibition.

B. 1.4.29 Prohibitions subject to authorization by the administration

Article 1 of Decree 320/1926 stipulates the prohibitions made with regard to the public domain except with the authorization of the administration. As such, it is forbidden to:

1. Prevent the free flow of public domain water;
2. Encroach, in any way, on the freeboard boundaries of temporary or permanent waterways, marshes, lakes, ponds and lagoons, and springs as well as the right-of-way boundaries of aqueducts, water pipes, navigation, irrigation, drying and drainage canals, the execution of which has been declared in the public interest. However, pre-existing constructions may be maintained and repaired with the double restriction that no increase in external dimensions will be made and that the materials used will be the same as those previously used;
3. Make any deposits, planting or cultivation on the freeboards and on the beds of temporary or permanent waterways, in lakes, marshes, ponds, and lagoons as well as between the right-of-way boundaries of water pipes, aqueducts, navigation, irrigation, drying and drainage canals, the execution of which has been declared in the public interest;
4. Remove turf, trees, shrubs, soil or stones from the freeboards or beds of temporary or permanent waterways, lakes, marshes, ponds, and lagoons;
5. Clean, deepen, straighten, or regularize temporary or permanent waterways;

6. Carry out excavations of any kind whatsoever at a certain distance from the freeboard boundaries of waterways, aqueducts, navigation, irrigation, drying and drainage canals, the depth of which is less than the said excavations, but no less than 3 meters.
7. Carry out works to search for or collect groundwater or gushing water. However, drilling of non-spouting wells, whose depth does not exceed 150 meters, may be carried out on private property without authorization. The 150-meter depth was adopted by the Penal Code in its Article 745 and later by Decree 14438 of 2 May 1970, which distinguished between the declaration regime for wells under 150 meters and the authorization regime for wells over 150 meters.
8. In general, undertake any permanent or temporary works likely to have an influence on the regime or flow of public domain waters.

B. 1.4.30 Absolute prohibition

Article 2 of Decree 320/1926 provides for absolute prohibitions of infringement on the public domain, making it forbidden to:

1. Destroy, overturn and/or deteriorate in any way, in whole or in part, the structures established for the use or conservation of public domain water, whether or not they are conceded, such as: bridges, dykes, aqueducts, navigation, irrigation, drying or drainage channels, surface or buried pipes, distribution devices, etc. This prohibition also applies to the dependencies of the structures in question and to structures protecting against water in the public domain.
2. Allow any water or substance likely to harm the hygiene, public convenience or proper use of such waters to flow, spread or discharge into public property waters, whether or not it has been conceded.
3. Apply animal fertilizers to land within the protection perimeter of a source used for public food; generate rubbish deposits and, in general, carry out any activity likely to cause pollution of the said source.

B. 1.4.31 Sanctions

Article 58 of Decree 320/1926 stipulated that citizens' violations of water policing, i.e. Articles 1 and 2, expose them to one day to six months imprisonment and a fine, or only one of these two penalties. In the event of a repeat offense within 18 months, the penalties are increased to a maximum except in the case of duly established good faith. In the event of a second repeat offense, the penalties may be doubled (Article 59).-

Finally, in the event of damage to the public domain and in addition to the penalties already mentioned, offenders may be ordered to pay repair costs.

Article 95 of the Code of Water (law 77/2018) provides that the criminal provisions of decree laws 144/1925 and 320/1926, Articles 745 to 749 of the Penal Code, Decree Law 8735/1974, Law 64 dated 12 August 1988 and Title 6 of Law 444 dated 29 July 2002 (Code of Protection of Environment) are still in force to protect the Water Sector.

B. 1.4.32 Criminal Provisions

The infringement of provisions concerning public waters is supposed to be recorded by the police and civil servants at the Ministry of Energy and Water. The penalties provided by the Penal Code (Articles 745 to 749) consist of imprisonment and/or fines. Article 745 specifies imprisonment up to one year and a fine for whoever undertakes without authorization to:

1. Search for or extract underground or spring waters with the exception of drilling on private property of non-springing wells whose depth does not exceed one hundred and fifty meters;
2. Carry out excavations at a distance from the limit of the land strip alongside water courses, aqueducts or irrigation or drainage canals, desiccation or drainage canals of less than the depth of the mentioned excavations and in any case inferior to three meters.
3. Remove stones, earth or sand, trees, bushes, or grass from the land strip along, or on the bed of, temporary or permanent water courses, lakes, marshes, ponds or lagoons;
4. Establish plantations, cultures or deposits of any nature on dikes adjacent lakes, marshes, ponds or lagoons, on land strips along or on the bed of temporary or permanent water courses, and between the limits of irrigation, desiccation or drainage canals, or between those of water pipes or aqueducts whose construction has been officially recognized as serving the public interest;
5. Trespass in whatever manner on dikes adjacent sources or temporary or permanent watercourses, marches, lakes, ponds, or lagoons, as well as on the limits of irrigation, desiccation or drainage canals, or between those of aqueducts or water pipes whose construction has been officially recognized as serving the public interest;
6. Obstruct the free flow of public property waters;
7. Undertake any permanent or temporary works that may influence the regime or flow of public property waters.

There is also a penalty sanction for any person who undertakes, without authorization, to dredge, deepen, straighten, or regulate temporary or permanent waterways (Art. 746 of the Penal Code). Still, the penalties stipulated in Articles 747 to 749 are heavier, whereby offenders are simultaneously subjected to a penalty of imprisonment and a fine for the following offenses:

> *Article 747- Whoever destroys, ruins or deteriorates all or part of the works, conceded or not, executed for the purposes of use or preservation of public property waters or for the purpose of protection against these waters - and especially bridges, dams, irrigation, desiccation or drainage canals, surface or underground water pipes, shall be punished by up to two years imprisonment and a fine...*

The law also provides that whoever damages public sources, infrastructure or equipment will be subjected to the same penalties stipulated in Article 747 of the Penal Code. Further penalties are found in Articles 748 and 749, which are clearly designed to protect the environment.

There have been few cases where these articles have been applied.

Taking into account the mentioned provisions, article 96 to 102 implement additional sanctions:

- In case of infringement of laws deteriorating the public health, food system, the fauna and the flora, imprisonment and/or fines from one to ten days and between one million to 15 million Lebanese Pounds are applicable (Article 96).
- In case of infringement in the sea, the sanctions are the same as in article 96.

B.2. INSTITUTIONAL FRAMEWORK

B. 2.1 INTRODUCTION

The institutional sector for the management of the water sector began to develop in Lebanon as of 1870 in line with the concessions granted first by the Ottoman Empire - mainly the concession to supply water to Beirut from the Nahr El Kalb River granted by the Sultan in this same year, and then by the French mandate authorities from 1920 onwards. The existence of multiple regional concessions made it possible to meet the needs of the population within their geographical limits, while still failing to ensure the general distribution of water throughout the country. This system of concessions began to be problematic with the restitution of the concession of the Beirut Water Company by the Lebanese State in 1951. A legal innovation was, then, introduced with the creation of the first public institution in Lebanon, namely the Beirut Water Authority, followed in the subsequent years by a series of public institutions in the various fields of economic activity, mainly with regard to the distribution of drinking water. However, the development of water needs in all sectors of economic activity made it necessary to regulate this sector in a methodical and coherent manner. As a result, water authorities were established in various regions or localities to distribute drinking water and were managed as public establishments, in addition to founding the Ministry of Hydroelectric Resources as per Law 20/66 of 29 March 1966. As part of the missions assigned to this Ministry, the generalization and execution of water projects were at the top of the list of objectives set out in the law, leading to the creation of the General Directorate of Hydroelectric Equipment. Hydraulic projects were studied and executed, and the water offices were responsible at a later stage for their operation and the distribution of drinking water to users. Furthermore, the General Directorate of Exploitation was to ensure the exercise of administrative and financial supervisory authority over these entities.

During the 1960s and early 1970s, the system began to operate with enough success to ensure the supply of drinking water to most users. Unfortunately, the 1975-1990 war interrupted the development of water projects, albeit without neglecting the State's obligation to ensure the continuity of management of the various water authorities through subsidies and benefits from the general budget.

After the war and from 1991 onwards, the need for a thorough review of the administrative structure of the water sector became apparent. Following several studies and research carried out mainly under the auspices of the World Bank, a series of decrees was issued on 13 December 1996 restructuring the existing water authorities.

However, even before the implementation of these decrees, a new step was taken with the promulgation of Law 221 of 29 May 2000 and its amendments (Law 241 of 7 August 2000 and Law 377 of 14 December 2001), which led to repealing these decrees and to merging the multiple water offices and commissions in Lebanon into four public establishments for water use.

Therefore, the need to analyse the current institutional situation of the water and wastewater sector to identify the problems in this field becomes clear, as institutional quality cannot but have a positive impact on the management of the sector. This said, the legislation regarding the Ministry of Energy and Water (Section B. 2.2), the various water-related ministries (Section B. 2.3), the public water

establishments (Section B. 2.4), the National Litani Authority (Section B. 2.5), and other institutions concerned by the water sector (Section 5) will be discussed in turn.

B. 2.2 PUBLIC ADMINISTRATION AND GOVERNMENT INSTITUTIONS

Water management has always been a prevalent problem in Lebanon. Until 1966, the administration responsible for water management was run by the Ministry of Public Works and Transport. Since then, a special ministry, today called the Ministry of Energy and Water, is responsible for the hydroelectric infrastructure of the national territory and is aided, on the regional and local levels, by autonomous water authorities.

B. 2.2.1 Missions

The Ministry of Energy and Water was created by Decree 20/66 on 29 March 1966 and comprises two general directorates, one for hydroelectric equipment and the second for exploitation. Its objectives are defined by Article 1 as follows:

- To apply, execute, supervise and manage hydroelectric projects.
- To apply the laws and regulations regarding the protection and use of public waters.
- To exercise a power of administrative supervision over the autonomous water authorities and commissions.
- To exercise a power of control over water concessions.

Within this general framework, the mission of the General Directorate of Hydroelectric Equipment is to plan, execute and supervise hydroelectric projects and to enforce the laws concerning public waters (Art. 9 of Decree 5469 dated 7 September 1966). As such, it has overseen, over the past twenty years, the execution of the available hydraulic infrastructures and delegated to the water authorities and commissions the responsibility of distributing water to users. As for the General Directorate of Exploitation, it is entrusted by Article 13 of Decree 5469 with a triple mission: to exercise the power of administrative supervision over the water authorities when the State acknowledges a right of supervision over these public bodies by decree adopted by the Council of Ministers; to govern the water concessions which the State subjects to its control by decree adopted by the Council of Ministers; and to enforce the laws concerning mines and quarries.

In 2000, the institutional reform of the water authorities was issued by Law 221 dated 29 May 2000, as well as its amendments by Law 241 dated 7 August 2000 and Law 377 dated 14 December 2001. According to the new regulations, the Ministry of Water and Energy has the following missions:

1. To collect, control, meter, establish statistics and study water resources, as well as to evaluate water needs and areas of use all over the Lebanese territory.
2. To control the quality of surface and underground water and the identity standards to be applied.

3. To establish the general planning project for the allocation and reparation of hydraulic resources used for drinking and irrigation on the national level, as well as to prepare and continuously update the National Water and Wastewater General Master Plan and submit it through the Minister for approval by the Council of Ministers.
4. To design, study, implement and operate large water installations and works, such as dams, artificial lakes, tunnels, water networks and rectification of waterways.
5. To implement, when needed, artificial recharge of underground water reservoirs and to control underground water extraction.
6. To protect water resources from losses and pollution by elaborating legal texts and taking necessary measures and dispositions to avoid water pollution, as well as to restore the natural quality of these water resources.
7. To give licenses and permits for water prospecting, public water usage and temporary occupation of public properties, and to finalize all the necessary formalities according to the laws and by-laws in force.
8. To implement studies and hydraulic, geological and hydrological researches, to collect technical data relative to hydraulic matters, to establish technical maps concerning these studies, researches and data, and to update them regularly.
9. To carry out control and supervision over water-related public establishments and other relevant bodies in accordance with the present laws, texts and provisions pertaining to these establishments and institutions.
10. To ameliorate performances of the WEs and evaluate their performances on the basis of indicators mentioned in the action plans, which have been approved according to legal procedures.
11. To establish standards to be adopted in the conduct and implementation of studies by the Water Exploitation Public Establishments, and to establish the conditions and regulations for extraction and use of surface water, underground water and management of wastewater, as well as quality standards and control.
12. To undertake public relations, provide the population with all necessary water-related information, and offer adequate orientation toward a rational usage.

B. 2.2.2 Organization

The Ministry of Energy and Water is composed of two general directorates (in accordance with Article 2 of Law 20/66 and Article 2 of Decree 5469 of 7/9/1966, amended by Law 247 of 7 August 2000 - organization of the Ministry of Energy and Water), namely the General Directorate of Hydroelectric Resources (I) and the General Directorate of Exploitation (II).

B. 2.2.3 The General Directorate of Hydraulic Resources and Electricity

Objectives

Article 9 of Decree 5469 of 7/9/1966 determines the objectives of the General Directorate of Hydraulic Resources and Electricity as follows: (a) to establish, execute or supervise the execution of water and electricity projects, and (b) to enforce laws and regulations pertaining to the protection and use of public waters.

Organization

Article 8 § 2 of Law 247 of 7 August 2000 determined the structure of the Directorate General of Hydraulic Resources and Electricity on the basis of seven services, namely (a) the Cabinet Service; (b) the Planning Service; (c) the Groundwater and Geology Service; (d) the Electrical Equipment Service; (e) the Execution Service; (f) the Research and Technical Facilities Service; and (g) the Consumption and Water Rights Service.

Article 8 § 4 of Law 247/2000 provided that all the administrative texts in force on 7 August 2000 pertaining to the services of the Directorate General of Hydraulic Resources and Electricity shall remain in force. Therefore, the following approach identifies the distribution of functions within the General Directorate before its restructuring, even as these functions must legally continue to apply awaiting the promulgation of a new text.

B. 2.2.4 General Directorate of Exploitation

Organization

Article 6 of Law 20/66 of 20 March 1966, amended by the law put into effect by Decree 6650 of 6/12/1973, provided that the General Directorate of Operations should comprise two directorates: the Supervisory Directorate and the Concession Control Directorate. Its mission, which is clearly defined in Article 23 of Decree 5469 of 7/6/1966 (organization of the Ministry of Energy and Water), has the following triple objective, two of which directly concern the water sector, namely: (i) the exercise of administrative supervisory authority over the committees in charge of water, electricity… etc. (ii) the control of water, electricity or other concessions, and (iii) the application of the legislation on mines and quarries. Article 8 § 3 and 4 of Law 247 of 7 August 2000 on the reorganization of the Ministry of Energy and Water established the situation and the functions of this Directorate General within the framework of the Ministry.

- The Concession Control Directorate (Article 36 of Decree 5469/66)
  It is composed of: (1) the Technical Service; (2) the Administrative Service, and (3) the Office of Mines and Quarries.

- The Supervisory Directorate (Article 40 of Decree 5469/66)
  Article 40 of Decree 5469/66 stipulates that the General Directorate of Exploitation should exercise the supervisory authority over the institutions in charge of water, electricity and ports. To this end, Article 41 provided that this Supervisory Directorate should include three services dedicated respectively to water, electricity and ports, albeit without providing an accurate description of their

mission. In 1972, the law put into effect by Decree 3044 of 25/3/1972 changed the situation so that the Water Control Service, and the Electricity and Ports Control Service were placed under the supervision of the Supervisory Directorate.

B. 2.3 ROLE AND ALLOCATION OF OTHER MINISTRIES WITH REGARD TO WATER

In addition to the Ministry of Energy and Water, which is responsible for the water sector, other ministries are concerned with water due to their competences and missions, namely the Ministries of Agriculture, Environment and Public Health.

B. 2.3.1 The Ministry of Agriculture

Article 1 of Law Decree 31 dated 18 January 1955 stipulates that the Ministry of Agriculture is in charge of:

- Undertaking technical studies for irrigation and draining projects;
- Supervising the execution of these projects;
- Organizing the distribution and use of irrigation water and controlling the implementation of this organization.

B. 2.3.2 The Ministry of Environment

The prerogatives and missions of the Ministry of Environment are currently determined by Article 2 of Law 690, dated 26 August 2005, which abrogated Law 216 of 2 April 1993 and its amendments.

Accordingly, what are the missions legally assigned to the Ministry of Environment with regard to water in particular?

1. To prepare the general policy on short, medium and long-term projects and plans in all that relates to the safeguarding and sustainability of natural environmental resources; to propose actions for the implementation of such projects and plans and to control their implementation.
2. To develop the strategy, work plans, programs, projects, activities and studies needed to safeguard the environment, ensure the sustainability of natural resources and control pollution from all sources.
3. To elaborate legislation, standards and measures and identify the standards and indicators necessary to guarantee the protection of the environment, the sustainability of natural resources… etc.
4. To determine the environmental conditions for the protection of rivers, springs, marshes, ponds… etc.

It is worth adding here that Articles 35 to 37 of Law 444 of 29/7/2002 (Environment Code) have sought to provide major legislative support for the protection of Lebanon's water resources, by recognizing the gains of existing legislation while also subjecting these resources to new protective measures based

on national environmental standards to (i) protect surface water and groundwater from any pollution risk; (ii) preserve aquatic ecosystems, sites and wetlands, and (iii) develop and protect water resources as being economic and ensure their distribution in all forms (Article 35). The Code linked the application of this policy to the promulgation of a joint decision by the Minister of Energy and Water and the Minister of Environment, which sets out the measures and policy for the development of integrated natural resource management related to the environment.

These measures shall apply to spills, discharges and direct or indirect deposits of materials of any kind, and, more generally, to any event likely to cause or increase pollution of surface and groundwater by modifying their physical, chemical, biological or bacteriological components.

In addition, Article 36 of Law 444/2002 stipulates that by decree issued by the Council of Ministers on the proposal of the Minister of Environment and the ministers concerned, the following shall be established:

- The procedure for drawing up the inventory of surface waters, waterways, lakes, ponds, springs and water networks to determine the extent of their pollution; this inventory shall be reviewed periodically or whenever an exceptional or unforeseen change affects the status of these waters.
- The quality standards that water intended for human consumption and other uses should meet;
- The physical, chemical, biological and bacteriological criteria to be met by waterways, sections of waterways, lakes, ponds and water distribution systems for the supply of drinking water to the public and other uses, as well as the time limits for meeting these criteria;
- The procedures for spills, discharges, direct or indirect deposits of materials of any kind and, more generally, for any event likely to cause or increase the degradation of water by modifying its physical, chemical, biological or bacteriological characteristics, whether surface water, groundwater or marine water, as well as the control of their implementation;
- The methods of analysis and control of the physical, chemical, biological or bacteriological characteristics of the water;
- Conservation measures that may be imposed by a competent authority or by the Minister of Environment to prevent any threat to public safety and health and any damage to the environment caused by the flow of waste water; and
- The time limits applicable to existing installations to comply with the provisions of the Code and its implementing regulations.

Finally, Article 37 of the Code provides that, without prejudice to the regulations in force, any facility carrying out water treatment operations must be subject to prior approval by the Minister of Environment, with an implementing decree establishing the date and procedures for the implementation of this text.

B. 2.3.3 The Ministry of Public Health

Article 35 of Decree 8377 of 30 December 1961, on the organization of the Ministry of Public Health provides that the Sanitary Engineering Service is responsible for (i) conducting studies and proposing

programs in accordance with the laws in force to ensure environmental health, and (ii) proposing the technical specifications and conditions to be met for the construction of public and private sewers and drinking water network construction projects.

B. 2.4 PUBLIC ESTABLISHMENTS FOR WATER EXPLOITATION

B. 2.4.1 General

On the local and regional levels, the State gradually repurchased, between 1950 and 1970, the hydraulic concessions that had been granted across the country. It also established authorities and commissions tasked with managing the repurchased concessions. Up until 2002, 44 authorities and local commissions had been created to manage the water sector.

In addition to this extreme fractionalization, many of these agencies' administrative structure is itself modelled on a board of directors along with a chairman and a directorate (general or not) according to the provisions of Decree 4517 dated 13 December 1972.

In 2000, the institutional reform of the water authorities was issued by Law 221 dated 29 May 2000, and its amendments by Law 241 dated 7 August 2000 and Law 337 dated 14 December 2001.

The powers of the Water Operation Establishments are as follows:

a. To study, execute, operate, maintain and renew distribution projects around drinking water and irrigation as well as wastewater collection and treatment, in accordance with the General Water and Sanitation Master Plan or with the prior approval of the Ministry to use public water sources.

b. To propose tariffs for drinking water, irrigation and sanitation services, taking into consideration the general socioeconomic conditions.

c. To control the quality of the distributed drinking and irrigation water, as well as the quality of effluents entering and leaving wastewater treatment plants.

d. The listed establishments will operate in accordance with their own regulations.

As a result, the new legislation assigns to the various establishments the function of executing and managing public drinking water, sanitation and irrigation services. The planning functions assigned to the establishments are part of a General Plan drawn up by the GD-HER of the Ministry of Energy and Water (MEW), this latter directive applying to both public and private users of water resources. It is within the framework of this General Plan that the MEW can grant licenses or permits to exploit public domain water resources.

Therefore, the legal framework provided by Law 221 seeks to delimit the areas of competence of the Ministry (policy, general planning, regulation of access to public domain resources, water policing, and, finally, control of the public operators' performance in terms of water resource conservation). It also defines the areas of competence of the establishments governed by the new legislation, including the implementation of the sector-specific policy and the development strategy defined by the General Water and Sanitation Plan within the framework of the applicable regulations.

Article 3 of Law 221/2000 amended by Article 1 of the Law 241/2000 implemented four public establishments for water exploitation (Beirut and Mount Lebanon, North Lebanon, South Lebanon and the Bekaa) with the following prerogatives: (i) to conduct studies and implement, exploit, maintain and renew water projects, and to distribute drinking and irrigation waters as well as collect, treat and drain wastewater according to the water and wastewater plan; (ii) to propose tariffs for water services (drinking, irrigation and wastewater) according to the social and economic conditions; and (iii) to control the quality of drinking and irrigation waters and that of wastewater at the exit of the treatment station.

More importantly, Paragraph 2 of Article 4 of Law 221/2000 stipulates that public establishments must act according to their own specific regulations.

On the administrative level, Article 5 of Law 221/2000 and its amendments provide that the public water exploitation establishments are governed by a Board of Directors, including a CEO and six members appointed by decree. The Board is entrusted with establishing all the internal regulations.

Law 221/2000 was to be followed by the promulgation of a series of regulations in accordance with the provisions of the last paragraph of Article 5 of the said law. Accordingly, the following decrees were promulgated in 2005:

1. For Beirut and Mount Lebanon Water Establishment (BMLWE)
   - Decree 14596 of 14/6/2005 – Rules of procedure
   - Decree 14597 of 14/6/2005 – Operating rules amended by Decree 1759 of 16/4/2009
   - Decree 14637 of 16/6/2005 – Financial regulations
   - Decree 14877 of 1/7/2005 – Staff rules and regulations
   - Decree 14915 of 5/7/2005 – Administrative organization

2. For Beirut Water Establishment (BWE)
   - Decree 14598 of 14/6/2005 – Rules of procedure
   - Decree 14599 of 14/6/2005 – Operating rules amended by Decree 1756 of 16/4/2009
   - Decree 14636 of 16/6/2005 – Financial regulations
   - Decree 14875 of 1/7/2005 – Staff rules and regulations
   - Decree 14916 of 5/7/2005 – Administrative organization

3. For South Lebanon Water Establishment (SLWE)
   - Decree 14600 of 14/6/2005 – Rules of procedure
   - Decree 14601 of 14/6/2005 – Operating rules amended by Decree 1758 of 16/4/2009
   - Decree 14638 of 16/6/2005 – Financial regulations
   - Decree 14639 of 16/6/2005 – Staff rules and regulations
   - Decree 14914 of 5/7/2005 – Administrative organization

4. For North Lebanon Water Establishment (NLWE)
   - Decree 14602 of 14/6/2005 – Rules of procedure
   - Decree 14603 of 14/6/2005 – Operating rules amended by Decree 1757 of 16/4/2009
   - Decree 14639 of 16/6/2005 – Financial regulations
   - Decree 14874 of 1/7/2005 – Staff rules and regulations
   - Decree 14913 of 5/7/2005 – Administrative organization

With regard to methodology, the following should be noted:

- The regulations that were promulgated in the following fields are identical for the four public establishments, namely a) the rules of procedure; b) financial regulations; and c) staff rules and regulations.
- The operating rules are the same for the public water establishments of the Bekaa, Beirut and Mount Lebanon, and North Lebanon, the only exception being the operating rules of the SLWE. Articles 56 to 86 in the operating rules were not incorporated into the operating rules of the SLWE. These articles specifically concern the classification of land, irrigation water users, administrative provisions relating to subscription, contract and duration, delimitation of irrigation perimeters, the increase or reduction of such perimeters, equipment, and the required infrastructure. This is obviously explained by the need to avoid encroaching on the prerogatives of the Litani River Authority in charge of irrigation in certain regions of South Lebanon (Kasmié, etc.).
- The administrative organization of the public water establishments as promulgated in the aforementioned decrees differs from one decree to another and is, therefore, not identical.

B. 2.4.2 Summary of the regulations

B. 2.4.3 Financial regulations

The financial regulations consist of 173 articles divided into four titles:

- Title I- General provisions:

  Two articles cover the definitions and purpose of these regulations.

- Title II- The budget of the Establishment.

  This title encompasses articles (from Article 3 to 121, included) with the following chapters:
  - Chapter 1 - General provisions (Articles 3 to 11) pertaining to the budget.
  - Chapter 2 - The budget (Articles 12 to 15), i.e. expenditure and revenue.
  - Chapter 3 - The preparation of the budget (Articles 16 to 18), which provides in Article 17 §5 for the possibility of resorting to loans to cover a deficit.
  - Chapter 4 - Approval of the budget (Articles 19 to 20).

- Chapter 5 - Implementation of the budget (Articles 21 to 75) divided into the following three sections:
  - Section 1 - Implementation of revenue (Articles 21 to 28)
  - Section 2 - Implementation of expenditures (Articles 29 to 60) with the four recognized stages of commitment, liquidation, sequencing and payment.
  - Section 3 - Payment of expenditures without a prior payment order (Articles 61 to 75).
- Chapter 6 - Various provisions (Articles 76 to 78) relating to the limitation period, credit re-commitment… etc.
- Chapter 7 - Provisions pertaining to the contracts (works, services, etc.) (Articles 79 to 121) with two sections:
  - Section 1 - on contracts setting out the standards applicable to invitations to tender; over-the-counter contracts, contracts for technical services and contracts on the basis of invoices.
  - Section 2 - consignment works (Articles 118 to 121).

- Title III- The accounting of the establishment

  Includes 48 articles (Articles 122 to 170) with six chapters:
  - Chapter 1 - Prerogatives and obligations of the accountant (Articles 122 to 126).
  - Chapter 2 - Responsibilities of the accountant (Articles 127 to 135).
  - Chapter 3 - Prerogatives and responsibilities of the cashier and collectors (Articles 136 to 145).
  - Chapter 4 - Various provisions (Articles 146 and 147) relating to a special regulation on the issuing of invoices and receipts.
  - Chapter 5 - Asset accounting (Articles 148 to 166).
    - Section 1 - General provisions (Articles 148 to 158).
    - Section 2 - General provisions pertaining to some accounts (Articles 159 to 167), namely the reserves, deposits and guarantees, and the cash advances account.
  - Chapter 6 - Product accounting (Articles 168 to 170).

- Title IV-Final provisions

Includes Articles 171 to 173, pertaining to the appointment of an independent auditor to monitor the accounts of the establishment in accordance with the provisions of Article 73 of Financial Law 326 of 28/6/2001.

B. 2.4.4 Rules of procedure

The rules of procedure of the Water Establishments consist of 23 articles relating to the following:

- The decision-making authority represented by the President and the members of the Board of Directors (Articles 4 to 8).
- The executing authority represented by the Chairman and Chief Executive Officer (Articles 9 to 14).

- The control authorities (Articles 15 to 17) represented by (a) the supervisory authority that approves the main decisions of the Board of Directors and (b) the Government Commissioner.

B. 2.4.5 Operating rules

The operating rules of Water Establishments consist of 89 articles divided into 5 chapters, with the exception of the operating rules already mentioned regarding the SLWE:

- Chapter 1 - General provisions (Articles 1 and 2) pertaining mainly to the powers of the regulations and definitions.
- Chapter 2 - Drinking water.
  - Section 1 - Subscriptions (Articles 3 to 10), i.e. the provisions relating to normal or temporary subscriptions, the subscription contract, its duration and the cancellation of the subscription.
  - Section 2 - Equipment and constructions (Articles 11 to 15) relating to networks, flow controls… etc.
  - Section 3 - Supply and disconnection of water (Articles 16 and 17), including the exemption of the Establishment from liability, in the event of interruption of water supply with or without notice.
  - Section 4 - Subscriber's obligations (Articles 18 to 20), including payment of invoices, notification of failures… etc.
  - Section 5 - Issuance and collection of invoices (Articles 21 to 29).
  - Section 6 - Quantity of water offered for subscription (Article 30) depending on the case: (a) residential houses, offices and commercial premises; (b) restaurants, cafés and cinemas; (c) hotels and hospitals; (d) printing presses, dry cleaners and schools; (e) bakeries and flour mills; (f) places of worship; (g) fuel and washing stations; (h) seaside resorts; (i) studios; (j) industries; (k) poultry farms; (l) construction sites, and (m) fire fighting.
  - Section 7 - Taxes and fees (Article 31), twenty-five in number.
  - Section 8 - The control and recording of infringements (Articles 32 to 43).
  - Section 9 - The fines (Articles 44 and 45), eight in number, identified in Article 44 and the distribution of the fines collected after deducting the price of water and damage repair between the employees of the Establishment.
- Chapter 3 - Wastewater (Articles 46 and 47)
  - Section 1 - Subscription to the wastewater collection network (Articles 48 and 49).
  - Section 2 - Networks and equipment (Articles 50 to 52).
  - Section 3 - Taxes and fees (Article 53).
  - Section 4 - The control and recording of infringements (Articles 54 and 55).
- Chapter 4 - Irrigation water (Article 56) with the possibility for the establishment to determine the land suitable for irrigation in the land classification tables for each irrigation project.
  - Section 1 - Subscription to irrigation water (Articles 57 to 65), including the contract, duration and the determination of the irrigable area...
  - Section 2 - Water distribution (Articles 66 to 68).

- Section 3 - Networks and equipment (Articles 69 and 70).
- Section 4 - Taxes and fees (Articles 71 to 73).
- Section 5 - The control and recording of infringements (Articles 74 to 82).
- Section 6 - Of the discharge (Articles 83 and 84).
- Section 7 - Non-use of irrigation water (Articles 85 and 86).

- Chapter 5 - Final provisions (Articles 87 to 89), particularly with respect to the waiver of payment for uncollected arrears.

B. 2.4.6 Evaluation

The draft rules of procedure clearly show that on a strictly legal level, the Water Establishments must operate in the spirit and letter of the Public Establishments themselves and not in any other form (such as privatization). Consequently, the proposed draft regulations were prepared taking into account the Public Accountancy Law and, even, the status of public establishments, the terms of which were reflected in the draft rules of procedure, since Article 3 of Law 221 and its amendments made it compulsory for water exploitation establishments to submit to their own regulations, which prohibited any direct recourse to Decree 4517/72 on public establishments.

From a strictly financial point of view, it is certain that the draft financial regulations have granted a greater financial autonomy to the Water Establishment by stipulating that the Director General may incur expenses of up to 50 million Lebanese Pounds (Article 10 of the financial regulations) compared to expenses, in other cases, of up to 200 million Lebanese Pounds by the Board (Article 15 of the draft rules of procedure) without consulting the regulatory authority unless required to do so. This aspect is undoubtedly positive, though certainly not enough, compared to the previous rules of procedure, especially since the regulatory authority, after approving the budget of the Establishment, reserves once again the right to approve contracts in excess of 200 million Lebanese Pounds.

Some specific remarks are worth mentioning:

- In the financial regulations, Article 20 §2 stipulates that the expenses of the Exploitation Establishment may be incurred on the basis of the provisional twelfths only for the month of January. Is it necessary to be so restrictive? Also, what would happen if the regulatory authority were to fail to approve the budget during this period?

- Article 13 (1) of the rules of procedure mentions a Deputy Director General, which cannot be envisaged under any circumstances - because the fundamental law did not provide for the possibility of appointing a Deputy Director General.

- Article 17 §7 of the rules of procedure stipulates that the government commissioner is to communicate all the minutes of the Board of Directors to the Court of Audit, the Central Inspection Board, the General Directorate of the Presidency of the Republic, the General Directorate of the Presidency of the Council of Ministers, and the rapporteur of the Performance Evaluation Commission. We believe that the minutes should only be notified to the regulatory authority, i.e. the Ministry of Energy and Water, whereas the Court of Audit and the Central Inspection Board would be notified of the minutes subject to legal proceedings. As for the General Directorates of the Presidency of the Republic and of the Council of Ministers, they should only be notified of the

minutes over which they exercise supervisory authority. In this specific case, it is difficult to see how these two General Directorates can serve as depositaries of the weekly minutes of the Exploitation Establishments' Board of Directors.

B. 2.4.7 The pricing policy

Article 10 (8) of Decree 4517 of 13 December 1972, stipulates that the Board of Directors would have to decide:

a. "On the tariffs and prices of sale and purchase and on the fees for the services provided by the establishment". Thus, the decree left it to each establishment to set the fees it considered necessary for the sound financial management of the establishment. The reform introduced by Law 221 of 29 May 2000 reinforced this principle of prerogatives left to the public establishment with regard to the pricing policy, since Article 4 of the above-mentioned law provides that "water establishments shall be responsible for the following, each within its own operating area and powers"

b. "The proposal of tariffs for irrigation drinking water and wastewater services, taking into consideration general socioeconomic conditions."

Therefore, two points are worth mentioning from a legal point of view:

- The first concerns the competence to propose tariffs, which is vested in the establishment. Thus, the Board of Directors of each establishment has the power to study and propose the rates necessary for proper management. However, the term "proposal" means that the decision of the Board of Directors is subject to the approval of the regulatory authority, which may obviously refuse to approve the pricing policy of the establishment.

- It is in this sense that the second point should be interpreted since the text of the law stipulates that this pricing policy must "take into account the general socioeconomic conditions".

On the one hand, the establishment must avoid any social crisis in the setting of tariffs. Therefore, it is quite possible that the set tariff does not really correspond to the requirements of a sound financial management of the establishment. On the other hand, the regulatory authority could always, before its approval, argue on the tariff for the same considerations.

In conclusion, while the text of the law grants the establishment the power to "propose" tariffs, this autonomy remains linked to general considerations, the interpretation of which could limit the margin of competence left to the establishment to determine a tariff in relation to the requirements of sound financial management.

B. 2.4.8 Participation of the private sector

Point 2 specifies that the regulations prohibit any form of private management of establishments or their subsidiaries. This statement deserves to be explained from a legal perspective. Indeed, one can hardly conceive how institutional reform could be successfully implemented without resorting to private operators who would introduce the management technologies needed to operate the establishments. Being strapped for qualified personnel in managerial positions - accounting, finance, customer management, fixed asset management, new works and maintenance - these establishments

would therefore have to resort to partnerships with private operators for the effective implementation of the appropriate management resources. These operations will require the establishment of international funding in close coordination with the CDR.

Judging by a comparison of the results obtained in Tripoli with the progress made in South Lebanon and in the Bekaa Water Establishment, it would probably be preferable for these partnership contracts to involve, as far as legally possible, performance obligations in terms of service quality. It is also essential that these contracts be concluded between the EPE acting as principal and the private operator acting as agent. With regard to supervision, the EPE remains solely responsible for the performance and administration of public services, while the agent must act under the supervision of the EPE.

B. 2.5 THE LITANI RIVER AUTHORITY

The development of the Litani River is a major project carried out by the Administration over the past 40 years. Established on 14 August 1954, the Litani River Authority enjoys legal personality and administrative and financial autonomy. Its objective is the execution and implementation of extensive works on the Litani, including key dams and power stations. It is endowed with a triple mission defined in Article 1 of its founding law, namely: to carry out the Litani project involving irrigation, drinking water, land improvement and electricity, to create a connecting grid between power stations in Lebanon, and to build electricity distribution stations in various Lebanese regions. It is important to point out that this experience was never the subject of a systematic legislative effort since no text was issued to determine the legal norms concerning the construction, development and exploitation of important resources in this area.

Article 7 of Law 221/2000 provides that the Litani River Authority is to continue operating in accordance with its specific regulations issued by law on 14/8/1954. It is subject to the provisions of Article 4 (2) of Law 221/2000, which stipulates that each public establishment has the obligation to contract with an audit company, and of Article 6 whereby the public establishment is submitted to the provisions of the Court of Audit and the Central Inspection Board, albeit not to those of the Civil Service Board.

In addition, the decision-making authority rests with the President of the Authority assisted by a Director General and Lebanese or foreign specialists (Article 11).

A special service within the Authority itself is responsible for the payment of any expenditures after verification of the amount and its validity (Article 10). The autonomous Fund for the financing of the Litani project is financed by advances from the Treasury and internal or external loans from international institutions with the guarantee of the State and part of the selling prices in the private domain of the State (Article 12). These advances from the Treasury to a special account are repayable in whole or in part in accordance with special laws when each phase of the Litani project is carried out.

Article 17 of the Law of 14 August 1954 also provides that the conditions for operating the Litani project after its execution and the conditions for operating the connection network would be laid down in a subsequent law, which has not been enacted since 1954.

B. 2.6 OTHER INSTITUTIONS CONCERNED BY THE WATER SECTOR

B. 2.6.1 The Council for Development and Reconstruction (CDR)

The CDR was established by Decree-Law 5 dated 31 January 1977 with wide prerogatives in the field of planning (Article 3), advice and orientations (Article 4) and project implementation (Article 5), including the direct implementation of any project by decision of the Council of Ministers (Article 5 §5) and the execution of any works related to the water and used water networks in any urban area (Article 5 §7-i).

Article 5 provided that the CDR has the authority to implement any works, including in the water sector, through any public authority, private company or mixed company.

B. 2.6.2 The Council for the South (Lebanon)

The Council for the South was established by Decree 14649 dated 12 June 1970.

Article 1 stipulated that the Council has full authority to conduct any work with a view to fulfilling basic needs in the South and to promote security and development. In this respect, the Council has the competence to appoint any public authority or private company to implement any project, including water works, for the purpose of addressing people's needs in South Lebanon.

B. 2.6.3 Municipalities

According to Article 49 §13 of Decree-Law 118 dated 30 June 1977, the municipal council of each city can implement local projects in the water sector. These projects are usually in accordance with local needs within the boundaries of the municipality in charge of implementing the used water networks and the evacuation of waste, among others. Article 74 provided that the president of the municipality has the right to authorize connection to the water used network even if the project was implemented by the union of municipalities or any other institution and even if it encompasses several municipalities.

B. 2.6.4 The Central Fund for the Displaced

The Central Fund for the Displaced was established by Law 193 dated 4 December 1993 to help displaced persons and families reintegrate their homes and villages. According to Article 1 of Law 193/1993, the Fund has the authority to finance projects, allow subsidies and loans, and implement all that is necessary to reinforce the socioeconomic situation.

Accordingly, the implementation of water projects is not clearly provided for in the law. Yet, the Central Fund for the Displaced is habilitated to implement small projects at the level of villages to contribute to the reintegration of the population.

SECTION C
Human Resources of the Water Establishments

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C.1 STATUS OF THE HUMAN RESOURCES AT THE WATER ESTABLISHMENTS

C.1.1 GENERAL

The understaffing of WEs is a recurrent issue often highlighted as the key factor behind the facilities' lack of operational capacity and the low levels of service.

The gap between the number of staff specified in the WEs' organizational decrees and the number of positions occupied is a key element/indicator in discussions on under-staffing. Based on the WEs' organizational decrees, there are large gaps in staffing at all water establishments.

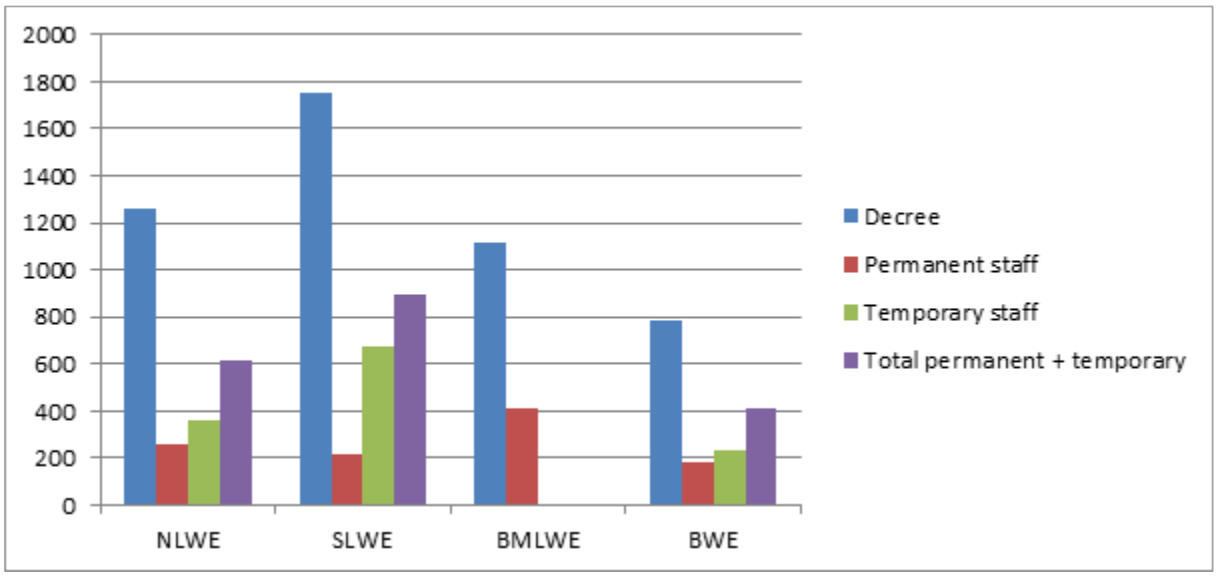

Figure C 1 Staffing status of the 4 WEs

An average of only 26% of the positions defined in the decrees are filled by permanent staff within the four WEs (20% for NLWE, 37% for BMLWE, 23% for BWE, and 12% for SLWE). All WEs recruit temporary staff to fill some positions but the sum of permanent and temporary staff combined covers only 50% of the planned positions - 49% in NLWE, 51% in SLWE and 52% in BWE.

However, several other factors need to be taken into account when considering this data:

- It does not include the number of staff working for the WEs' subcontractors (for pumping station management as well as for the operation and maintenance of the wastewater treatment plant…etc). HR data on this group of staff was not available. However, including the staff members in the HR regionally allocated to service management could narrow the staffing gap and reduce the apparent need for mass recruitment within the WEs.
- The numbers of staff members do not reflect the performance of WEs. This is true and makes it rather important to analyze the qualifications of existing members towards a better understanding of performance enhancement possibilities that would concern them or consider the necessity to recruit more qualified personnel.

- The graph above does not provide any insight into the WEs' internal staff management qualifications, as well as policies and practices, which could either compensate for these human resources deficits or, in contrast, exacerbate the situation.

Developing a more in-depth understanding of these elements can help better analyze the issue of WEs' understaffing. To provide this insight, several indicators may be relevant:

- The qualifications of permanent and temporary staff: Qualifications do not constitute a single criterion because they do not take into account the length of time staff have been working at the WE or the practical knowledge and knowhow of the teams. However, they do provide an indication of:
    - the WEs' ability to recruit qualified staff in terms of salary, job attractiveness and other criteria, which appears to be limited for the NLWE;
    - the alignment of the WE's HR policy with their core mission. Given the WE's mission, there is an obvious need for engineers);
    - the management structure set up within the WE.
- The staff categories for permanent staff and their position within each WE:
  Staff members are recruited through the Public Service Council. Therefore, they are classified under categories. Category 1 is the highest level with high qualifications (engineers or advanced university graduates). Individuals under this group perform management functions. They are directly supported by people under Category 2, also of high qualification level. Category 3 is for individuals of intermediate level that assist the higher category people in team management. They are in charge of managing projects, missions, reports' production… etc. The qualification level of people under this category is high. They also include engineers for example. Finally, categories 4 and 5 are made up of task execution teams with lower qualifications (technical BT, high school or even no degree whatsoever). Analyzing staff categories in each WE makes it possible to measure internal management capacity and effectiveness (considering that categories 1 to 3 have management responsibilities for categories 4 and 5).

- The position of permanent staff provides an insight into the institution's internal organization and makes it possible to define strategic recommendations for their HR development.
- The main profiles and positions of temporary staff provide an understanding of the needs prioritized by institutions.
- The qualifications and positions of engineers - when available, either on a permanent or temporary basis - who are key staff within water utilities, help identify gaps and needs, as well as draft recommendations for further recruitment.

Analysis of these indicators by WEs will enable a general analysis of the WEs' situation and help define strategic orientations for their development and service management improvements.

N.B.: The data collected from the WEs is not always of the same scope and level of detail. The level of detail in the analysis of the situation within each WE varies, therefore, depending on the available data. However, this situation does not prevent major identified trends and recommendations for the improvement of sector management.

C.1.2 NLWE INTERNAL ORGANIZATION, HR STATUS AND MANAGEMENT

C.1.2.1 Permanent staff

General

According to its Organization Decree, the NLWE structure relies on 1,256 positions, but only 258 of these positions are occupied by permanent staff recruited through public administration procedures (civil servant council).

The qualifications of the staff in place are relatively good and more balanced than in the other WEs, but expectations to have more engineering expertise exist for a utility that covers an area of about 1.7 million inhabitants.

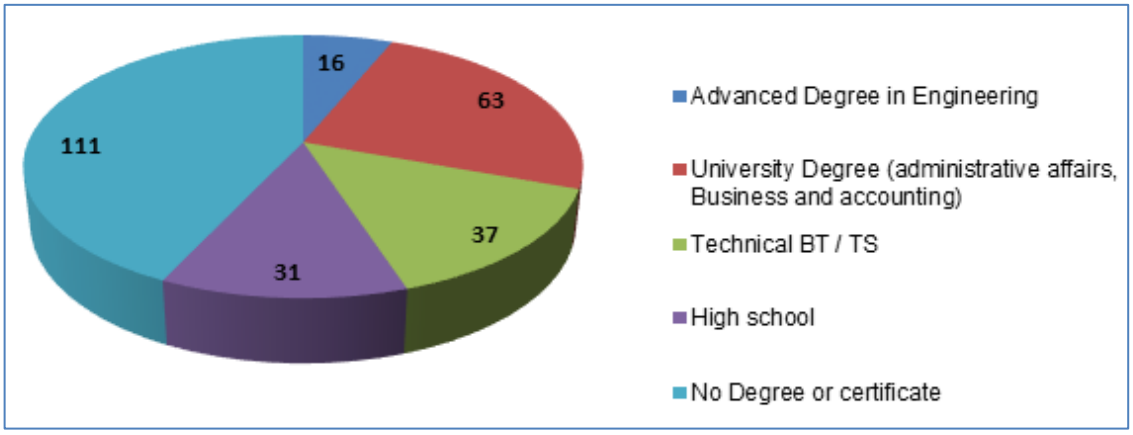

Figure C 2 NLWE permanent staff qualifications

Based on the medium level of qualifications, the categories of permanent staff, as defined by the public administration, correspond more to execution than to management.

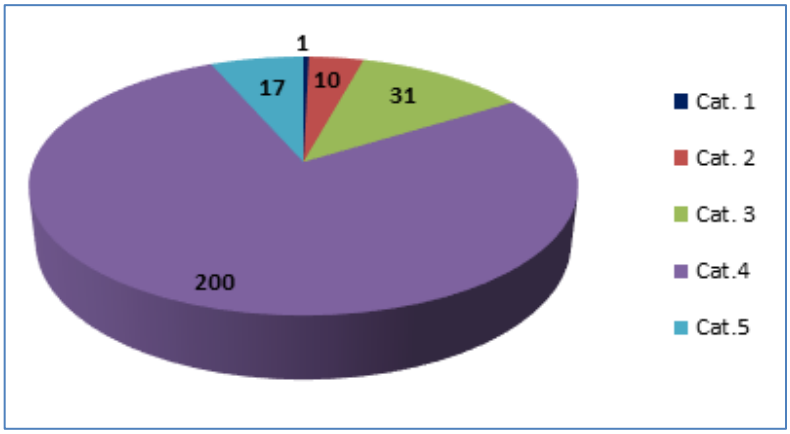

Figure C 3 NLWE categories of staff

In terms of categories 1 and 2, the water establishment respectively has one employee (the General Director) and 10 staff members (mostly engineers). In addition, 84% of the permanent staff belong to categories 4 and 5.

Depending on the hierarchical level of category 3 staff members, some of whom may carry management responsibilities, this group's breakdown may create gaps in the teams' management. If only a few category 3 staff members hold a management position, the manager/staff ratio could be up to 20 people per manager, which is high. It also makes team management time-consuming, and may divert the executive staff from their strategic functions and limit the WE's internal capacity to develop strategic analysis and planning or to set up a specific high-level taskforce to oversee and monitor services.

Figure C 4 below shows the positions held by permanent staff in NLWE's main departments.

The analysis of staff allocation within NLWE has to be compared to its current organization chart. See Figure C 5 below.

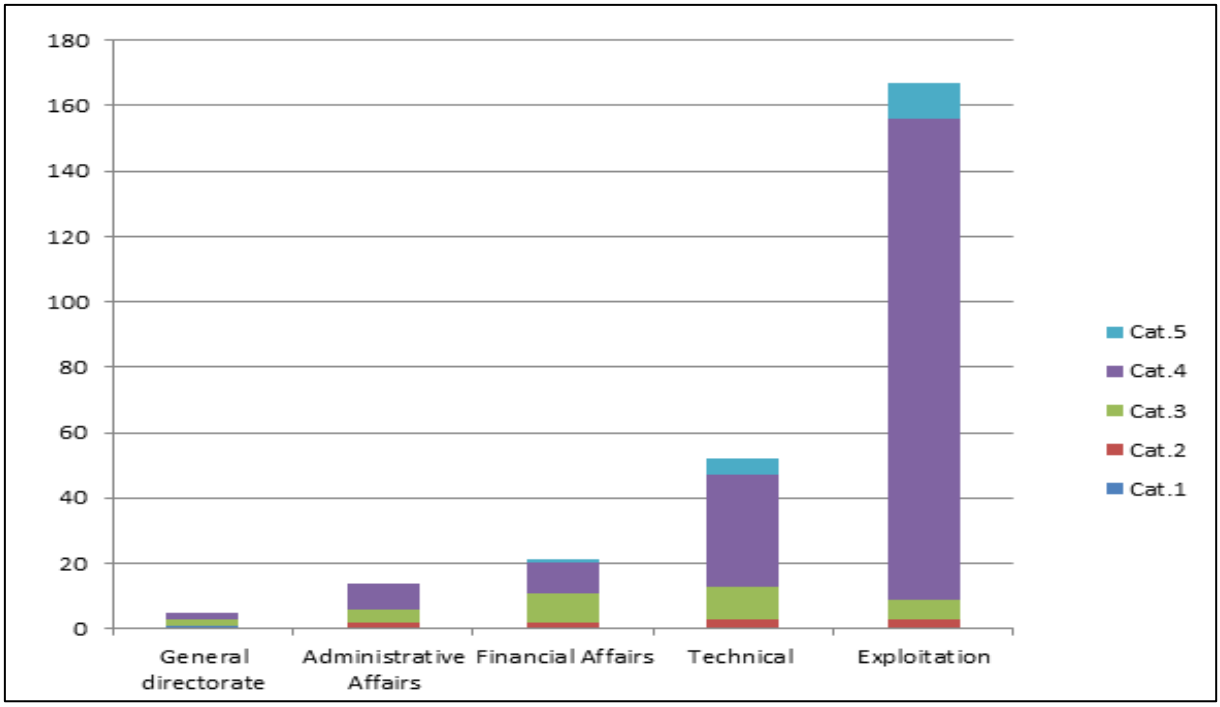

Figure C 4 NLWE's Permanent staff positions per department and per category

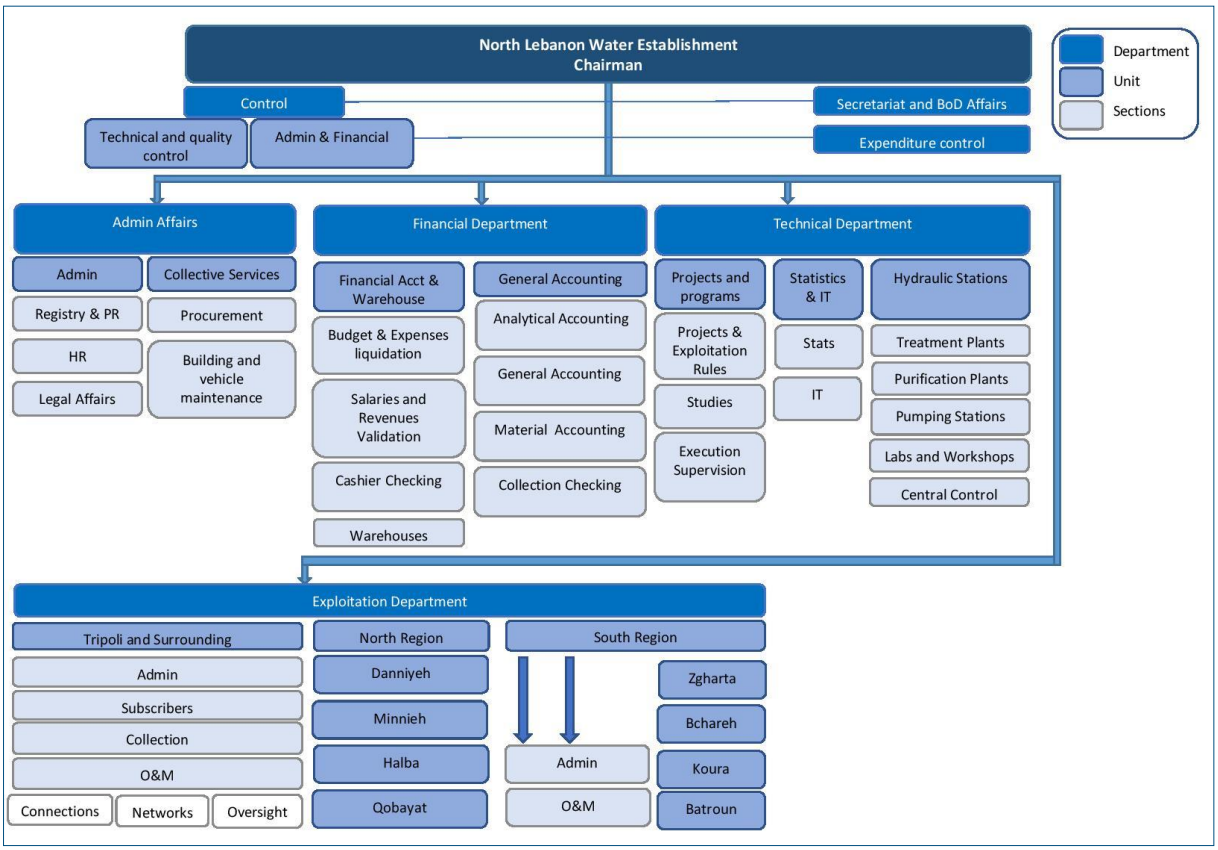

Figure C 5 NLWE's organization chart

Permanent staff's key challenges at NLWE

Four main Departments - Administrative affairs, Finance, Technical and Exploitation – make up the operating structure of NLWE. A Control department under the supervision of the Chairman carries the responsibilities of technical and quality control as well as administrative and financial control. Within the Exploitation Department, local units and sections represent the WE in the regions. Regional Units have both administrative, subscribers', operational and maintenance units in charge of the service delivery and facilities management. The NLWE has no department nor section dedicated to wastewater management and irrigation, which are part of the WE core missions. No central department nor unit focusing on subscribers' management and communication exist.

The distribution of staff is broadly consistent with the size and missions of the concerned departments:

- The Exploitation Department has offices that cover the entire region and conducts regular interventions in the field. It, thus, has the biggest number of staff, particularly those working in task execution. However, the number of management staff is very low, thus implying that the Units Manager has to supervise a large number of employees and would have limited time to carry out reporting and service quality monitoring activities. In addition, due to the lack of staff within the Exploitation Department (which should have a headcount of 557 according to the Organization Decree), management (categories 2/3) and support (category 3) staff have to perform administrative tasks directly, which also reduces the time they have available to spend on team management.

- The Administrative Affairs and Financial Departments have a lower staff headcount but appear to have more qualified members, which seems logical considering the tasks and activities they are required to carry out.

- Apparently, only few Technical Department staff members are available. No information was found on subcontractors used for waterworks operation activities (37 permanent staff). However, given the lack of WE staff, it would be reasonable to assume that private operators contracted by the NLWE manage the operation and maintenance of these waterworks. Nevertheless, a larger number of staff members should be working on the Projects and Programs, and the Statistics and IT units (13 permanent staff according to the Decree), as most of their activities and tasks are internal and should not be delegated to private operators. The Technical Department is strategic as its role is to assess, plan and oversee all investments, studies and projects, as well as to monitor all sector and service indicators.

- There is no specific unit or team working on irrigation and wastewater. It would be possible to recruit specific staff within the Exploitation Department without having to review the relatively broad organization chart. However, there is a need to review the organization of the Technical Department to highlight these functions.

- The WE does not have a specific Customer Relations Department (only teams in each local unit), which limits its ability to monitor and analyze user practices, regional demand trends and overall client management.

- Permanent employees have to cover several positions within the WE to fill gaps. As a result, some employees were recruited to work in one unit or department but actually hold other positions (IT specialist in charge of HR, engineer in charge of finance etc.).

To fill these gaps within the different departments, the WE has requested authorization to recruit 100 permanent staff (profiles and positions were not provided to the Consultant), but the public sector-wide recruitment freeze has prevented the continuation of this recruitment drive. One solution envisaged by the WE would be to delegate the management of specific services to the private sector and refocus on contract management. However, such a decision would require staff that specialize in managing these contracts, especially of the performance-based type, and who have the technical skills required to supervise and monitor private operators.

In response to the permanent staff recruitment freeze, NLWE has been hiring temporary staff (i.e. daily contractors). The qualifications, profiles and main positions of these temporary staff were assessed to supplement the WE HR status review.

C.1.2.2 NLWE temporary staff

NLWE hires a large number of temporary staff (357 temporary compared to 258 permanent staff). Temporary staff include daily contractors who may work full or part time at the WE. It is difficult to conduct an analysis of their positions, as data on the volume of work they carry out is practically non-existent. Nevertheless, the number of temporary staff used provides some insight into the gap that the WE is trying to fill.

As for permanent staff, the average qualification level of the temporary staff is quite low.

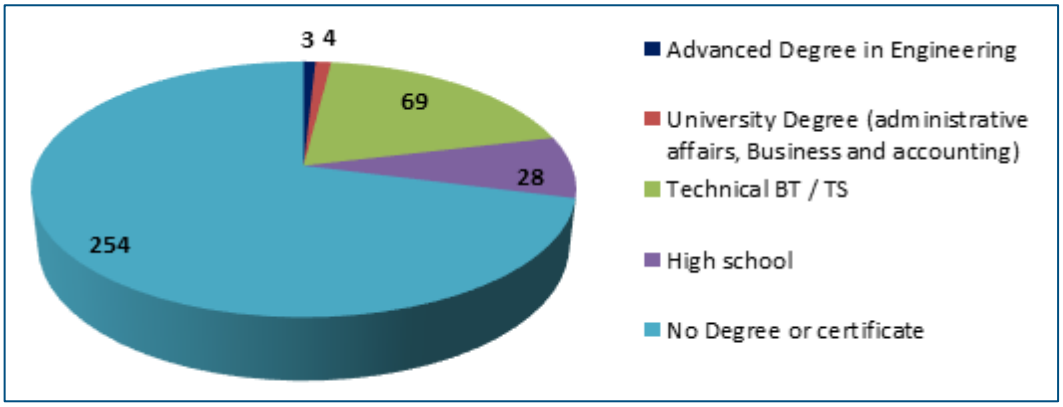

Figure C 6 Qualifications of temporary staff recruited by NLWE

It is therefore logical that the main positions occupied by temporary staff are also at the lower level.

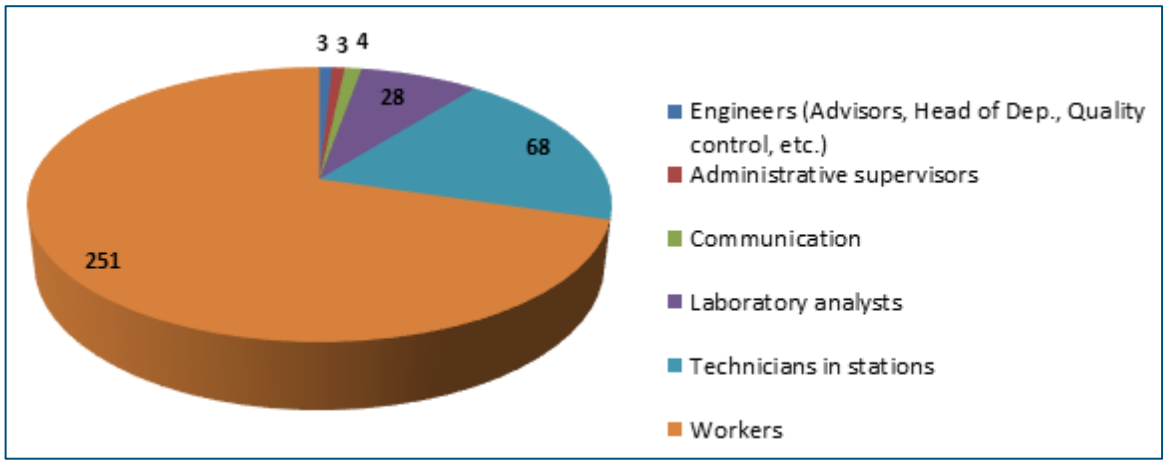

Figure C 7 Main positions/profiles of temporary staff recruited by NLWE

Analysis of the information available on temporary staff resulted in the following findings:

- Based on the need for permanent technical staff with engineering skills, it is striking to see that very few engineers are usually recruited through daily contracts to fill the gaps. However, the limited budget of the WE might restrict its ability to recruit skilled staff even for temporary positions. An alternative explanation could be that the WE's priority is to ensure additional staff are available to conduct daily operational tasks rather than occupy strategic positions.
- The majority of the staff working in the laboratory is temporary (2 category 3 permanent staff and 28 temporary staff).
- The majority of temporary staff members is recruited to work in the waterworks/treatment plants and operation and maintenance activities in local units.
- Temporary workers also include cleaning staff, drivers, guards, among others, thus putting into relative perspective the large number of recruited temporary staff, as compared to the headcount

of permanent staff. In conclusion, temporary staff do not replace permanent staff, especially at the highest levels of the WE organizational chart, but instead fill existing gaps by occupying technical, specific and lower positions.

C.1.2.3 NLWE: Focus on engineers

The 19 engineers working within NLWE (16 permanent and 3 temporary) have the following profiles:

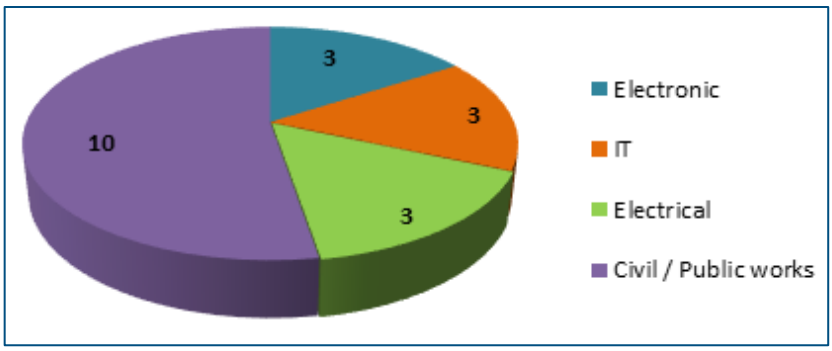

Figure C 8 Profiles of NLWE engineers

Surprisingly, no engineer specializes in hydraulic engineering, water management, wastewater management or the environment.

C.1.2.4 Main findings and conclusions

The water establishment's organizational decree has recently been revised while keeping the spirit of the 2005 decree. Thus, the planned staff distribution appears to have been designed to enable direct management of the facilities (331 staff in the waterworks/458 staff working on O&M in the local units). The reality of the staffing situation makes it extremely difficult for the WE to carry out these direct management tasks. The recruitment freeze means that the initial thinking behind this organizational decree needs to be reviewed.

Understaffing is critical in the Technical and Exploitation Departments and recruiting private contractors for O&M appears to be a relevant approach. However, before outsourcing activities, the WE has to undertake a reorganization that should be based on:

- increasing the size of the Procurement Unit, which only has 1 of the 7 staff indicated in the decree;
- developing performance-based contracts and providing specific training and support to the legal and procurement teams and to the technical staff in charge of overseeing and monitoring these contracts;
- progressively reorganizing the Exploitation Department by creating a unit in charge of supervising the private operators and, if necessary, reassigning the staff currently in charge of maintenance operations to this private operator supervision unit.

Specialist water, wastewater and irrigation engineers are a top recruitment priority, but IT specialists (engineers or technicians) are also required to develop the WE's monitoring and data management capacities.

Finally, it seems necessary to strengthen the WE's management structure by recruiting high-level staff. Such a strategy is in alignment with the recruitment of engineers, while hiring staff members with university or business school degrees is also crucial to develop a customer-based strategy and improve service management.

C.1.3 BMLWE'S INTERNAL ORGANIZATION, HR STATUS AND MANAGEMENT

C.1.3.1 Permanent staff

General

According to its Organization Decree, the BMLWE's organizational structure should comprise 1,120 positions, but permanent staff recruited through public administration procedures occupy only 415 positions.

The level of staff qualifications is low, and 78% of the permanent employees have no degree or have had no further education after high school. This is worrying for a water utility that should ultimately provide services to over 2.9 million inhabitants. This said, 80% of these are currently benefitting from the BMLWE's services. However, this low number of staff (especially in wastewater management) has hampered the technical and administrative capacities of the water establishment to increase its service coverage and handle new customers.

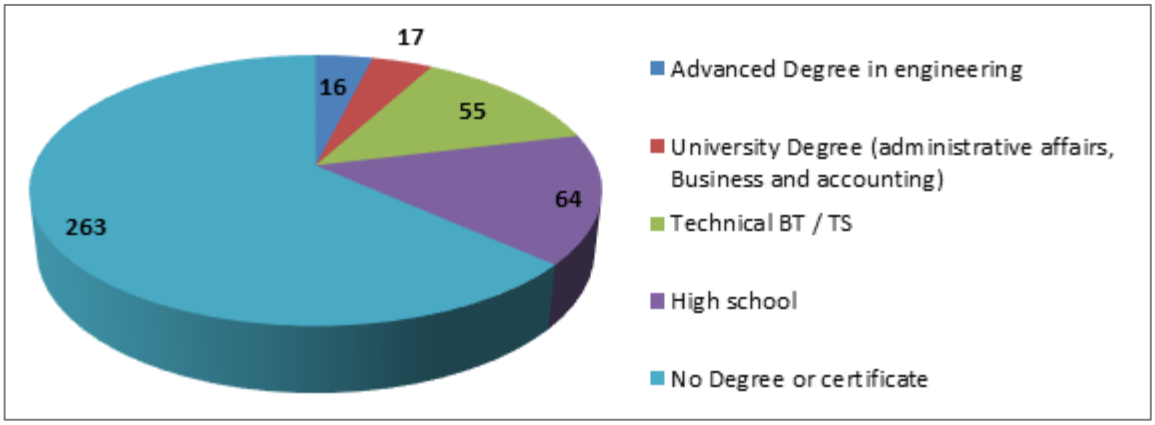

Figure C 9 BMLWE's permanent staff qualifications

In accordance with the low level of qualifications, the majority of permanent employees are in staff categories, as defined by the public administration, that correspond to execution and there are few qualified staff for team management.

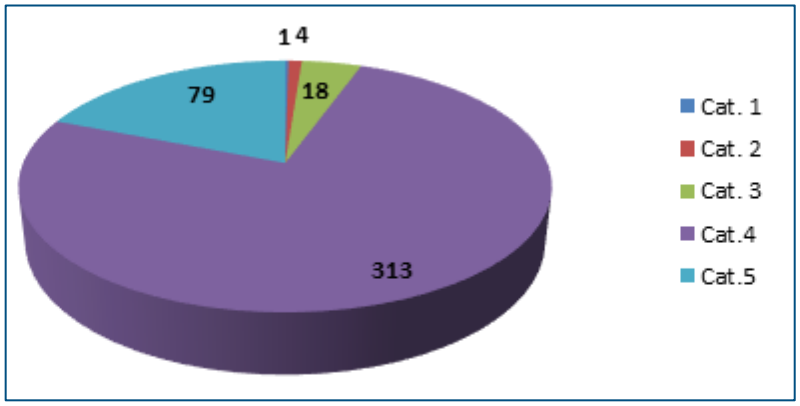

Figure C 10 BMLWE's permanent staff categories

BMLWE only has one category 1 employee (the General Director) and 4 staff who belong to category 2 (university graduates). Moreover, 94% of the permanent staff are under categories 4 and 5. Such a situation implies that there are gaps in team management. If only a few category 3 staff members hold a management position, the manager to staff ratio could be up to 20 people per manager, which is quite high. It also makes team management time-consuming and may divert the executive staff from their strategic functions and limit the WE's internal capacity to develop strategic analysis and planning or to set up a specific high-level taskforce overseeing and monitoring services.

The positions held by permanent staff within the main WE departments are shown on Figure C 11 below.

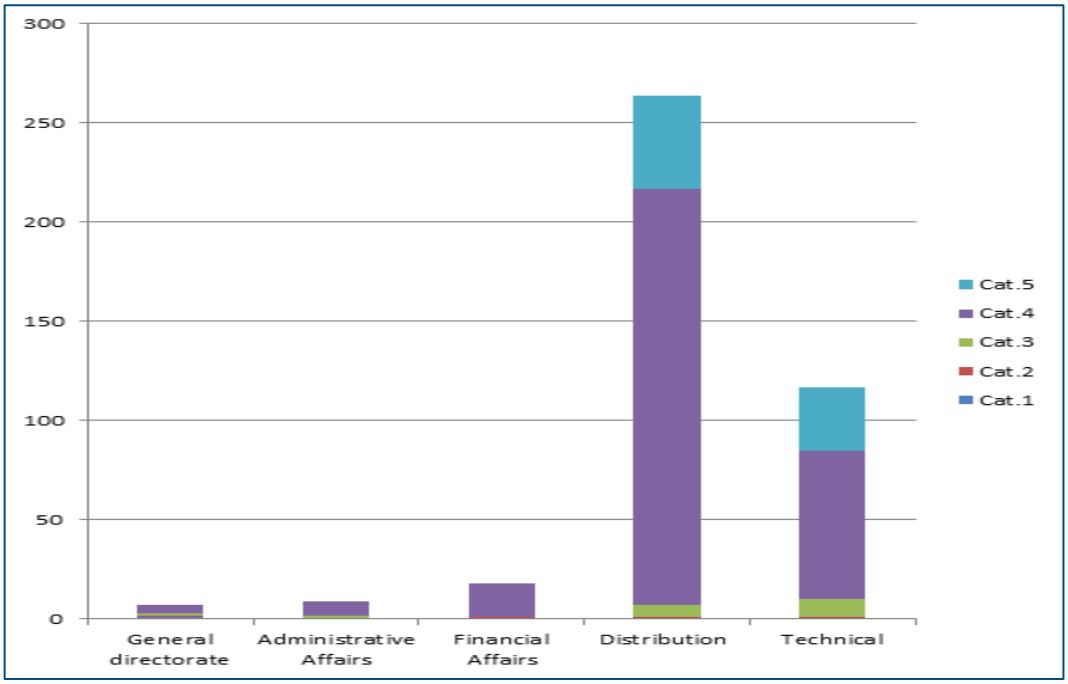

Figure C 11 BMLWE's permanent staff positions per department and per category

Permanent Staff's key challenges at BMLWE

The first and most striking observation is that there are very few management staff in most departments, especially in the Administrative and Financial ones. Category 4 staff mostly run these departments, and of most of them (based on cross-referencing data in the category and qualification charts) have no degree or basic training for conducting skilled tasks, especially in accounting, finance, procurement and legal affairs.

A category 2 engineer heads both the Technical and Distribution Departments, but category 3 staff are responsible for most of the management tasks. Activities in both departments are, thus, carried out predominantly by category 4 and 5 staff members under the management of staff in category 3. This may not be sufficient, especially in the local units located some distance away from the WE's headquarters - and, therefore, from the management center - and which would require staff to have autonomous management and reporting skills.

Analysis of staff allocation within the WE has to be compared to its current organizational chart. See Figure C 12, below.

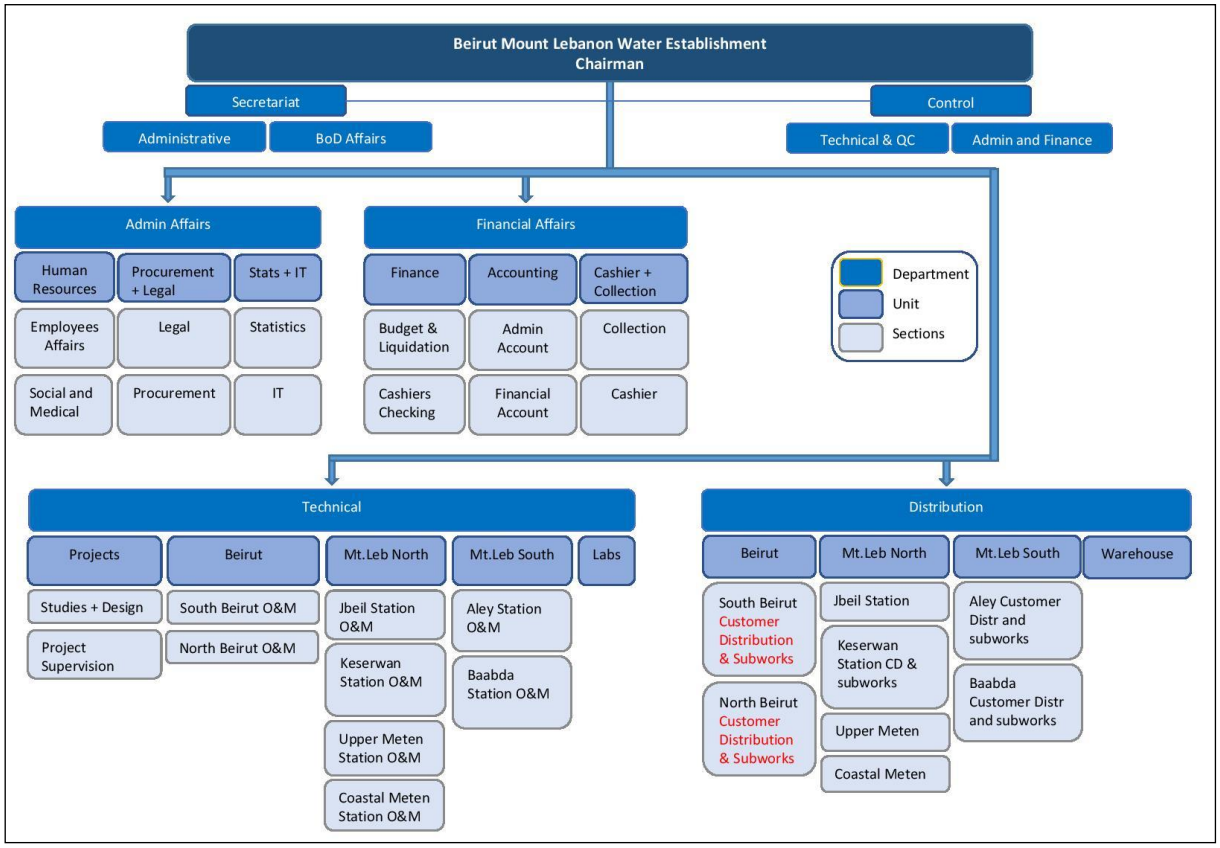

Figure C 12 Current BMLWE organizational chart

The structure of the BMLWE is based on four Departments (Administrative and financial affairs, as well as technical and distribution matters). A specific Control Department for technical, quality, administrative and financial activities is directly attached to the Chairman. Both Technical and Distribution Departments have local units for the management of services and facilities. The WE has

no customers' department at the central level - only customer sections within each regional unit of the Distribution Department exist. There is a statistics and IT unit within the Administrative Department that collects and manages all data related to the staff, services, facilities and water resources management. There is no specific communication unit or department nor wastewater and irrigation department or unit.

The Technical Department focuses on studies and projects' production and laboratories. The studies (2 staff including 1 engineer), projects (1 staff engineer) and laboratory teams (1 category 3 employee) have very few allocated staff. The main studies and project implementation activities are outsourced to private companies and temporary staff are recruited for the laboratory (detailed data is not available). Given that these teams are so understaffed, the WE is unlikely to have the capacities supervise the work carried out by the contractors.

The Distribution Department is the best staffed - with 262 staff, equal to 63% of the total WE headcount - but only has one employee under category 2 and six members under category 3 for eight geographic teams. In other words, concerning some teams, no category 3 staff member (engineer or university graduate) is there to manage the teams. This is the case in the Keserwan team, where only nine permanent employees are there, and in the North Beirut team, which has 13 category 4 employees.

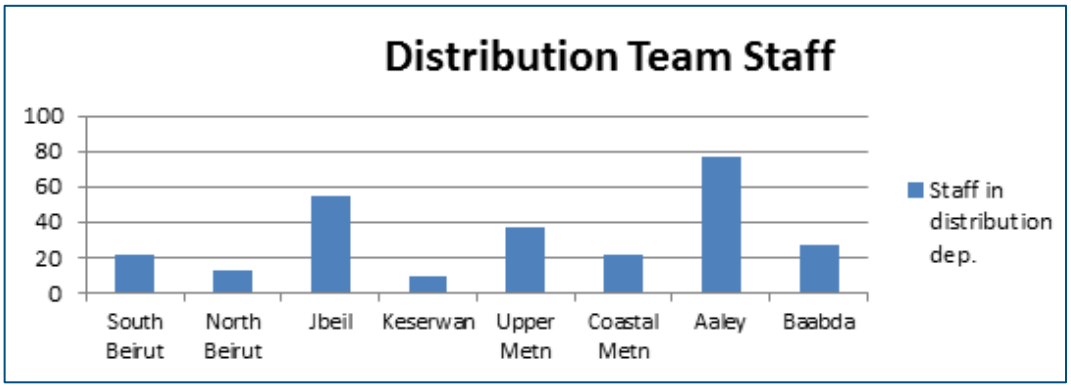

Figure C 13 BMLWE's permanent staff allocated to each distribution team

Data about the temporary staff recruited by BMLWE is not available. Therefore, determining the total headcount for these teams is practically impossible. However, reports have highlighted management problems in Keserwan and confirmed that these are due to low staffing levels and lack of management staff, a situation of concern for field teams who are in contact with users and require appropriate management.

The organizational chart also shows that there is no specific unit or team for irrigation and wastewater, which are part of the WE's core mission. Specific staff could be recruited, but the organizational chart would have to be reviewed, as a result. The wastewater management service, which mainly involves managing pumping pre-treatment stations, is currently provided through contracts with private operators. In Ghadir, for example, when the plant was taken over by the water establishment in 2008, one-year maintenance contracts were signed between the water establishment and a private company. Since then, the contracts have been reassigned to a new operator through a call for tenders

launched by the WE which bases its selection of bids on the best bidder. Companies replace one another but most of the teams remain in place. Only the contracting company changes and takes over the management of the operation and maintenance teams. The recruitment process has been slightly improved in recent years, making it possible to recruit operators based on technical quality. However, the process is still unsuitable in terms of ensuring the effective, efficient and sustainable management of more technically complex facilities. As the water establishment is not in a position to recruit enough staff for its local distribution units, staff recruitment for sanitation is even more difficult and the direct management of facilities is not possible with the current situation. It is therefore a priority for the water establishment to strengthen its system for recruiting and overseeing private wastewater management operators. With the support of partners, the WE has already started to develop performance-based contracts for managing leaks on the network.

There is also no specific monitoring and reporting team, with the exception of the Statistics and IT Unit that is too understaffed to carry out proper data processing and reporting on service management (from production to the end-users). It could be useful to consider creating a specific unit to handle this matter.

The WE does not have a specific Customer Relations Department - only teams in each local unit - which limits its ability to monitor and analyze user practices, regional demand trends and overall customer management.

Finally, permanent employees have to cover several positions within the WE in order to fill gaps. Some employees are recruited to work in one team or a department but actually hold other positions (for instance: (i) IT engineer in charge of statistics, but also payroll; (ii) technical staff from local teams in charge of administrative tasks; and (iii) data analyst who also manages a local team. This situation leads to a lack of well-being at work for these employees, as well as a lack of effectiveness and efficiency, and tension between the teams. This management (or lack of management) consequently exacerbates the perception of understaffing.

C.1.3.2 Temporary staff

No data is available on temporary staff at the BMLWE.

C.1.3.3 Focus on engineers

The 16 permanent engineers within the WE have the following profiles:

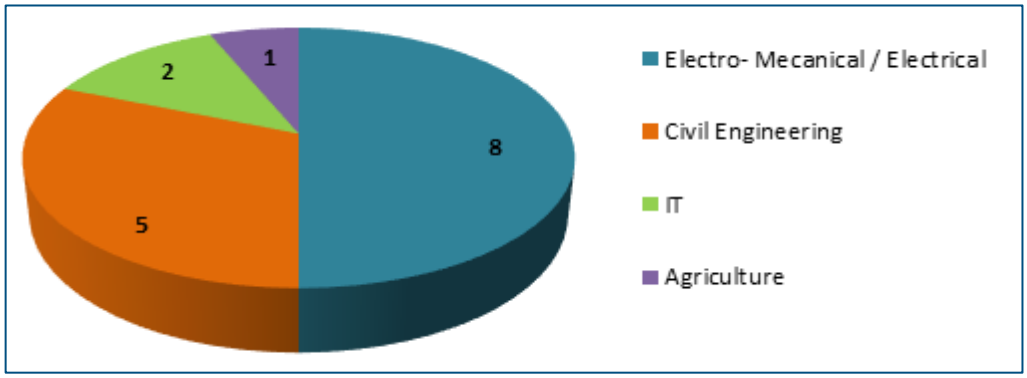

Figure C 14 BMLWE permanent engineers' profiles

They represent 3% of the total headcount, which is extremely low considering the technical functions that the water establishment has to carry out. In addition, no engineer who specializes in hydraulic engineering, water management, wastewater management or the environment were hired.

Data about temporary staff is not available, limiting the scope of the analysis. However, the recruitment of engineers that specialize in the core functions of the WE appears to be a priority for the development of the WE.

C.1.3.4 Main findings and conclusions

The lack of data on temporary staff makes the analysis incomplete, as there is no information on their profiles or the positions they hold, and perhaps they fill some important gaps. Nevertheless, a number of reports and interviews confirm that these temporary employees are not sufficient to change the situation and the impact of this recruitment remains rather limited on the internal management front, as well as in terms of technical and strategic capacities.

As for the NLWE, the first main finding was that the organizational Decree is structured based on the facilities' direct management. The staffing situation makes it extremely difficult for the WE to carry out these direct management roles. The recruitment freeze means that a revision of the initial thinking behind this organizational decree is necessary.

Understaffing is critical within all departments. However, the assignment of several tasks to employees that do not correspond to their initial training or specialization, and of management functions to employees without the requisite profiles, exacerbates the teams' perception of short-staffing and creates a poor working environment that has an adverse effect on efficiency and effectiveness.

Due to the recruitment freeze and increase in the WE's workload, particularly on wastewater, the recruitment of private operators to carry out O&M tasks on facilities appears to be a relevant approach. However, the WE has to undertake a reorganization that should be based on:

- Increasing the size of the Procurement Unit, which has only two category 4 staff members to enable BMLWE to develop and monitor performance-based contracts with the private sector;
- Developing performance-based contracts and providing specific training and support to the legal and procurement teams and to the technical staff in charge of overseeing and monitoring these contracts;
- Progressively reorganizing the Technical and Distribution Departments by creating a unit in charge of supervising the private operators and, if necessary, reassigning O&M activities currently undertaken by WE staff to the newly contracted private operators, as well as benefitting from the current staff experience in O&M to oversee the private operator as part of the supervision unit.

Water, wastewater and irrigation engineers are a top recruitment priority, but IT specialists (engineers or technicians) are also needed to develop the WE's monitoring and data management capacities.

Finally, recruiting high-level staff seems to be a high priority for the strengthening of the WE's management structure. Such a statement goes in line with the recruitment of engineers, while keeping

in mind that the recruitment of staff equipped with a university or business school degree is equally crucial to develop a customer-based strategy and further improve service management.

C.1.4 BWE'S INTERNAL ORGANIZATION, HR STATUS AND MANAGEMENT

C.1.4.1 Permanent staff

General

According to its Organizational Decree, the BWE's organizational structure should comprise 786 positions, but permanent staff recruited through public administration procedures (civil servant council) occupy only 181 positions.

The level of permanent staff qualifications is low and 72% have no degree or no further education whatsoever after high school.

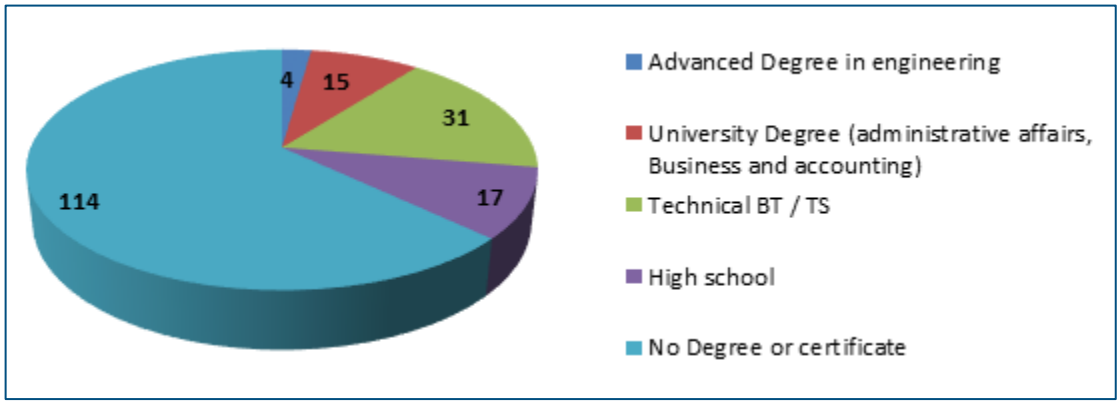

Figure C 15 BWE's permanent staff qualifications

The general manager considers that only 50% of the permanent staff are currently efficient and cost-effective. Due to the low level of staff qualifications, the WE only has a few employees in the high staff categories; 1% belong to categories 1 and 2, rising to 4% when category 3 staff are included.

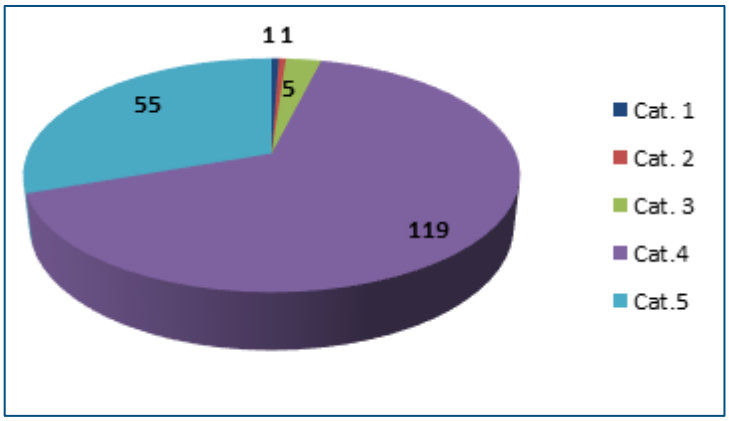

Figure C 16 BWE's categories of permanent staff

This is a major team management challenge for the WE as there are up to 30 staff members per manager - this includes category 3 staff as managers and assumes that all of the highest category staff members are able to manage teams. Consequently, staff in higher categories will not have enough time to carry out their strategic functions, which limits the WE's internal capacity to develop strategic analysis and planning or to set up a specific high-level taskforce overseeing and monitoring services.

The positions held by permanent staff in the main WE departments appear in Figure C 17, below.

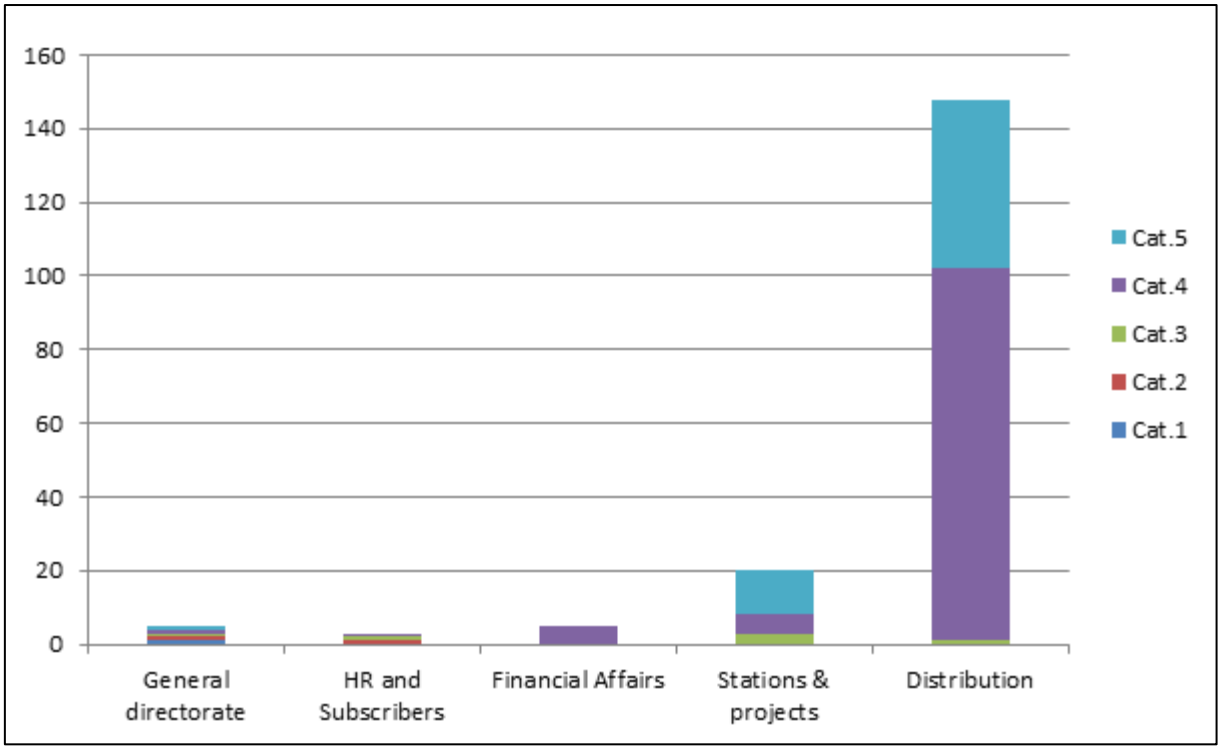

Figure C 17 Positions of permanent staff within BWE

Analysis of staff allocation within the BWE has to be compared to its current organizational chart. See Figure C 18, below.

The BWE organizational chart is based on four main Departments (Human Resources and Subscribers, Financial, Plants and Projects, and Distribution and Maintenance). The Distribution and Maintenance Department has local Chambers covering the BWE operation's area. The establishment has a central subscribers' Department and is currently developing a data center managed by the SCADA system. There is no unit managing wastewater and irrigation.

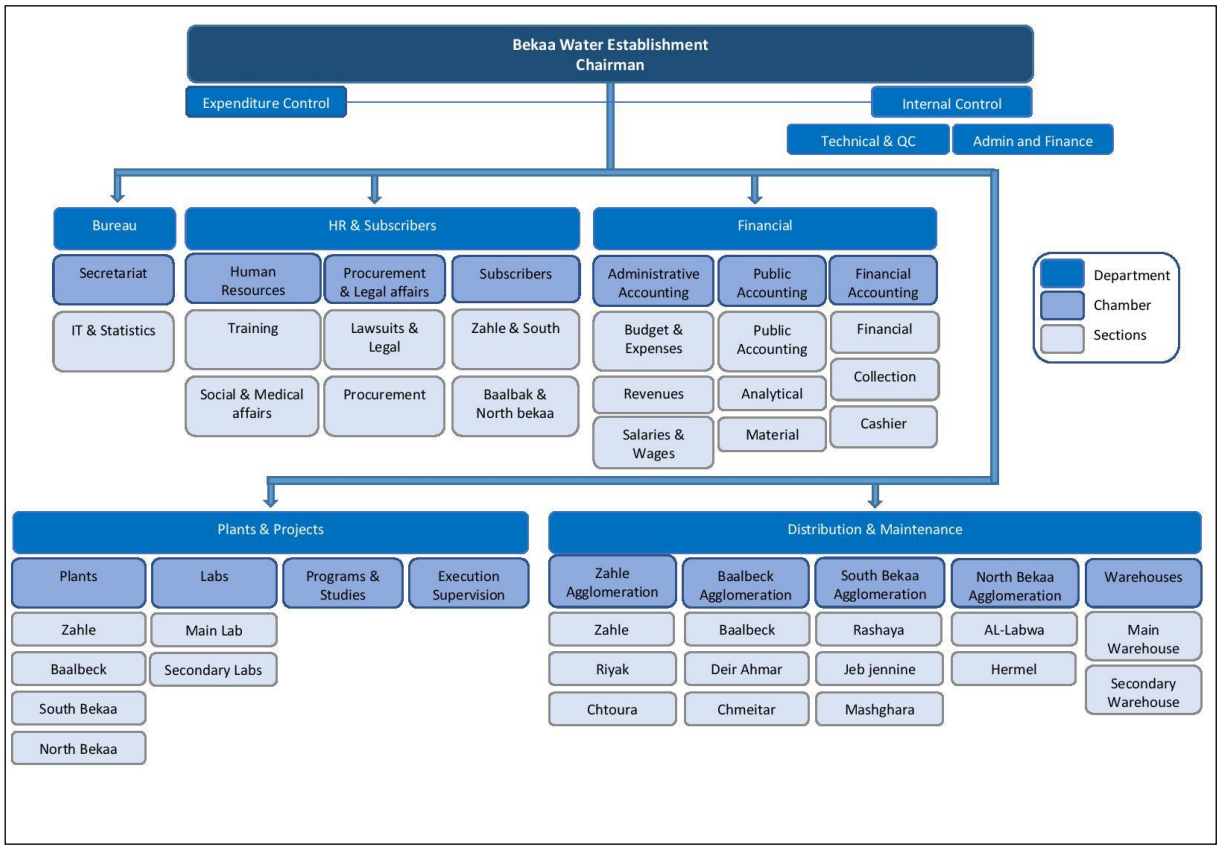

Figure C 18 BWE's organizational chart

Permanent Staff's key challenges at the BWE

Staff distribution is broadly consistent with the size and functions of the departments:

- The Distribution and Maintenance Department has offices that cover the entire region and ensures regular interventions in the field. It is thus the best staffed in terms of task execution staff, but there are very few managers (only three category 3 staff). This means either that the team managers have to supervise a large number of staff, and thus lack the time to carry out their reporting and service-quality monitoring duties, or that category 4 staff run the teams. This is insufficient, especially for the local teams located some distance away from the water establishment's headquarters - and therefore from the management center - requiring employees to have autonomous management and reporting skills.
- HR and Subscribers (Customers), as well as Financial Departments have a lower staff allocation. The HR department has more qualified staff, which seems relevant considering the tasks and duties it has to perform, but the Financial Department is run entirely by category 4 staff. This situation could be counterbalanced by assigning several tasks to more qualified staff members that cover several positions. In addition, some of the Financial Department staff - even under category 4 - appear to be suitably qualified for their roles and have sound knowledge of their department.
- The HR and Subscribers (Customers) Department is equivalent to the administrative department in the other WEs, consisting of HR, procurement and legal affairs, in addition to Customers' Management. It enables the overall monitoring of customers, but this department could benefit

from being upgraded to the level of Customer Relations Department (including water supply, as well as wastewater and irrigation users) being created.

- The Technical Department appears to be understaffed. The department has to manage water production activities (plants), water quality testing (laboratories), the preparation of studies and projects and supervision. The department has only 20 staff to perform these functions and only three category 3 staff to manage the teams, mostly composed of category 5 staff (12 people). There is no data available about subcontractors but, considering the shortage in staff, it would be reasonable to assume that waterworks' operation and maintenance management is outsourced to private operators. However, the department's capacity to supervise private operators seems limited and the framework of the contracts (one-year service contracts) is not adapted to proper service management. In addition, there should be more skilled staff to perform this department's strategic functions (assessing, planning and supervising all investment, studies and projects). The WE's General Manager would like to merge the Distribution, and Plants and Projects Departments to avoid the transfer of responsibilities between the two.

- The organization chart shows that there is no specific unit or team for irrigation and wastewater, which are part of the WE's core mission. The wastewater management service, which currently involves managing pumping stations and three wastewater treatment plants, is provided through service contracts with private operators. As for the water production and distribution contracts with private operators, the WE is only allowed to sign annual service contracts for the operation and maintenance of the plants. All maintenance remains the direct financial responsibility of the WE, who purchases the necessary equipment identified by the private operator. The operator is only in charge of recruiting the staff to operate the facilities. Yet, the WE is only partially relieved of these tasks. The framework of these contracts needs to be reviewed to introduce full performance-based contracts that cover a five-year period, as a minimum.

- The water establishment is not in a position to recruit enough skilled staff for its local distribution teams and for its Technical Department; but staff recruitment for sanitation is even more difficult and the direct management of facilities is not possible as things currently stand. It is, therefore, a priority for the water establishment to strengthen its system for recruiting and overseeing private operators.

- There is no specific monitoring and reporting team, with the exception of the Statistics and IT Department, which reports directly to the General Directorate and is too understaffed to conduct proper data processing and reporting on service management (from production to the end-users). It would therefore be worthwhile to create a specific unit. The current implementation of the SCADA system is an opportunity to develop an improved monitoring and reporting team.

- Permanent employees have to cover several positions within the WE to fill gaps. As a result, some employees are recruited to work in one section or department but actually hold other positions. Meanwhile, others have to fill positions that are above their staff category without the associated wage increase. This situation leads to a lack of well-being at work for these employees, as well as to a minimized effectiveness and efficiency, and tension between the teams.

C.1.4.2 Temporary staff

In response to the permanent staff recruitment freeze, and to fill some of the staffing gaps, the water establishment hires temporary staff (daily contractors). The qualifications, profiles and main positions of these temporary staff have been assessed to supplement the WE's HR status review.

The WE hires a large number of temporary staff (234 temporary staff compared to 181 permanent employees). Temporary staff comprise daily contractors that may work full or part-time at the WE. It is difficult to conduct an analysis of their positions, as there is no data on the volume of work they carry out. Nevertheless, the number of temporary staff used provides an insight into the gap that the WE is trying to fill.

As the case is with the permanent staff, the average level of temporary staff qualifications is relatively low.

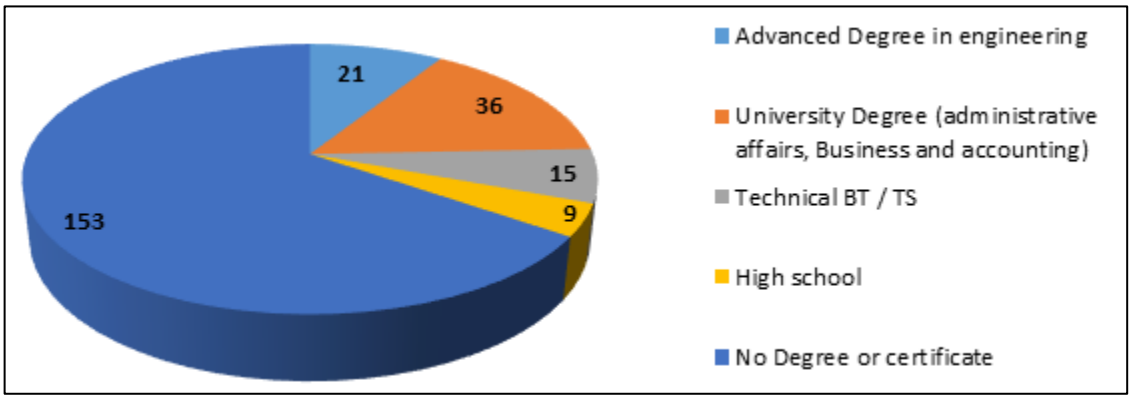

Figure C 19 BWE's temporary staff qualifications

The management sought to recruit engineers and university graduates. The 21 engineers recruited since the management's appointment have replaced some of the temporary staff, but the WE's limited budget hinders their ability to recruit more highly qualified staff.

The main positions held by these staff members are as follows:

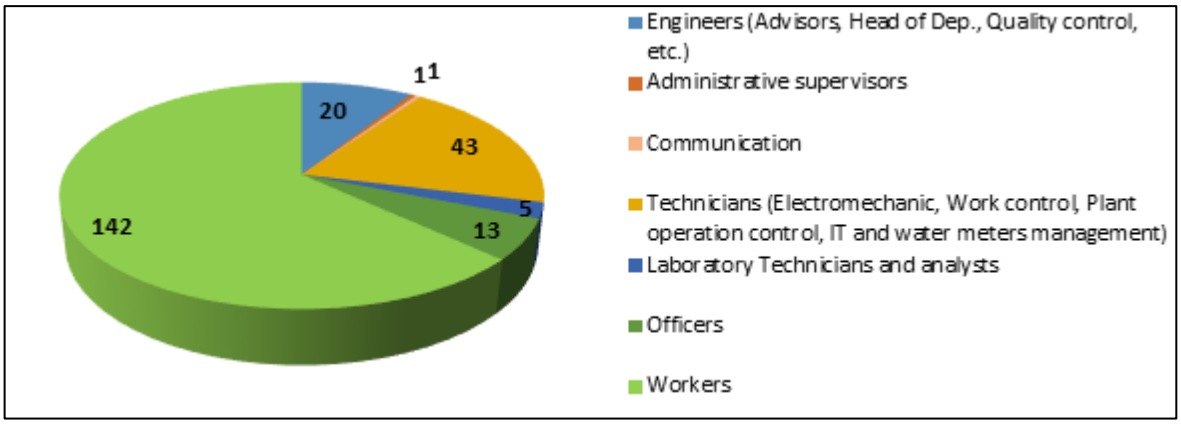

Figure C 20 BWE's temporary staff positions

Analysis of the information available on temporary staff has resulted in the following findings:

- The majority of temporary staff is recruited to work in the waterworks/treatment plants and in operation and maintenance activities as part of local teams;
- Temporary workers also include cleaning staff, drivers, guards and others, putting into relative perspective the large number of recruited temporary staff compared to the headcount of permanent employees.
- Faced with the issue of highly qualified and high category staff whose work is unsatisfactory, the WE seeks to recruit temporary staff members to conduct strategic or tasks requiring higher skills within the WE.

C.1.4.3 Focus on engineers

The 25 engineers working within the WE (four permanent and 21 temporary) have the following profiles:

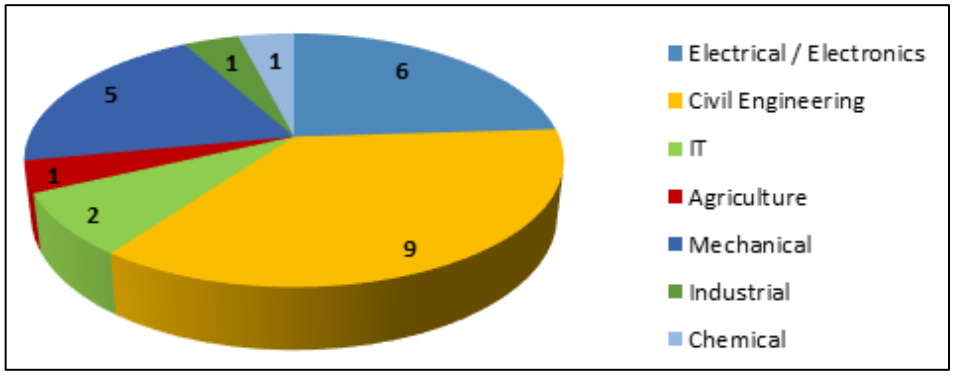

Figure C 21 Profiles of BWE engineers

Despite the management's efforts to increase the number of engineers, they make up only 6% of the total headcount, which is still low considering the technical activities that the water establishment has to carry out. In addition, there is no hydraulics, water management, wastewater management or environmental engineers.

C.1.4.4 Main findings and conclusions

The first main finding is that, as for the other WEs, the BWE Organizational Decree is based on direct management of the facilities. However, the staffing situation makes it extremely difficult for the WE to carry out these direct management tasks. The recruitment freeze means that the initial thinking behind this organizational decree needs to be reviewed.

Understaffing within the water establishment is critical in the Plants and Projects, and in the Distribution Departments. Also, recruiting private operators for O&M activities appears to be a relevant approach. However, the WE has to undertake a reorganization that should be based on:

- increasing the size of the Procurement Unit (that is understaffed and under skilled) to enable the BWE to develop and monitor performance-based contracts with the private sector;

- reviewing the current contracting framework, developing performance-based contracts, and providing specific training and support to the legal and procurement sections and to the technical staff in charge of supervising and monitoring these contracts.

Specialist water, wastewater and irrigation engineers are a top recruitment priority, but IT specialists (engineers or technicians) are should also be hired to develop the WE's monitoring and data management capacities. The WE is implementing the SCADA system and has planned to hire two engineers (one is already in place). However, more staff (technicians and engineers) are needed to operate this system.

Reorganization of the WE is essential. However, it would be better and more efficient to conduct this reorganization progressively and not rush to define an exhaustive organizational chart. The WE needs to be reorganized in accordance with the skills of the permanent staff and any gaps need to be identified to prioritize recruitment.

Finally, it seems necessary to strengthen the water establishment's management structure by recruiting high-level staff. Such a decision is aligned with the recruitment of engineers and the internal reorganization of the WE, but hiring staff with university or business school degrees is also crucial in to develop a customer-based strategy and improve service management.

C.1.5 SLWE'S INTERNAL ORGANIZATION, HR STATUS AND MANAGEMENT

C.1.5.1 Permanent staff

General

According to its Organization Decree, the SLWE structure relies on 1,749 positions, but only 221 of these positions are occupied by permanent staff recruited through public administration procedures (civil servant council).

The qualifications of the permanent staff in place are relatively good and more balanced than in the other WEs but more engineering expertise is expected for a utility that covers an area of about 1.2 million inhabitants.

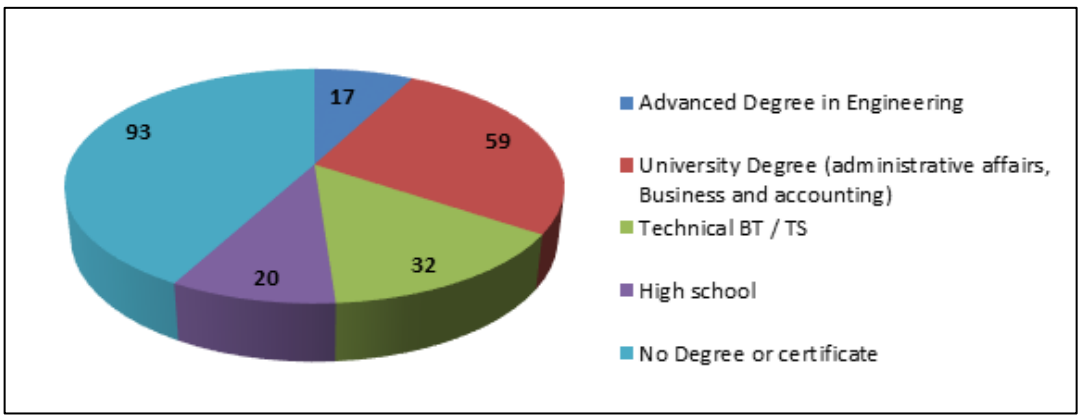

Figure C 22 SLWE's permanent staff qualifications

Based on the medium level of qualifications, the categories of permanent staff (as defined by the public administration) correspond more to execution than to management.

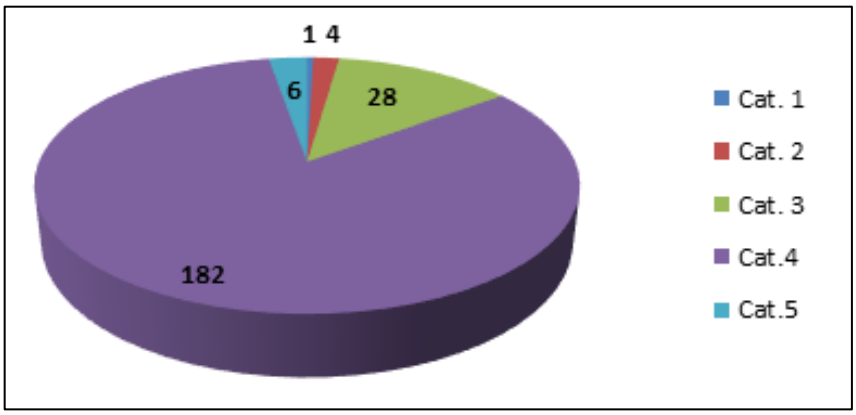

Figure C 23 SLWE's categories of staff

The water establishment has only one category 1 member of staff (the General Director) and four employees who fall under category 2 (mostly engineers). In addition, 85% of the permanent staff belong to categories 4 and 5.

Depending on the hierarchical level of category 3 staff (some may have management responsibilities), this category breakdown may create gaps in the teams' management. If only a few category 3 staff hold a management position, the manager/staff ratio could reach up to 40 people per manager, which is very high. It also makes team management time-consuming and may divert the executive staff from their strategic functions and limit the WE's internal capacity to develop strategic analysis and planning or to set up a specific high-level taskforce overseeing and monitoring services.

The positions held by permanent staff members in the main WE departments appear in Figure C 24, below.

Analysis of staff allocation within the WE has to be compared to its current organizational chart. See Figure C 25, below.

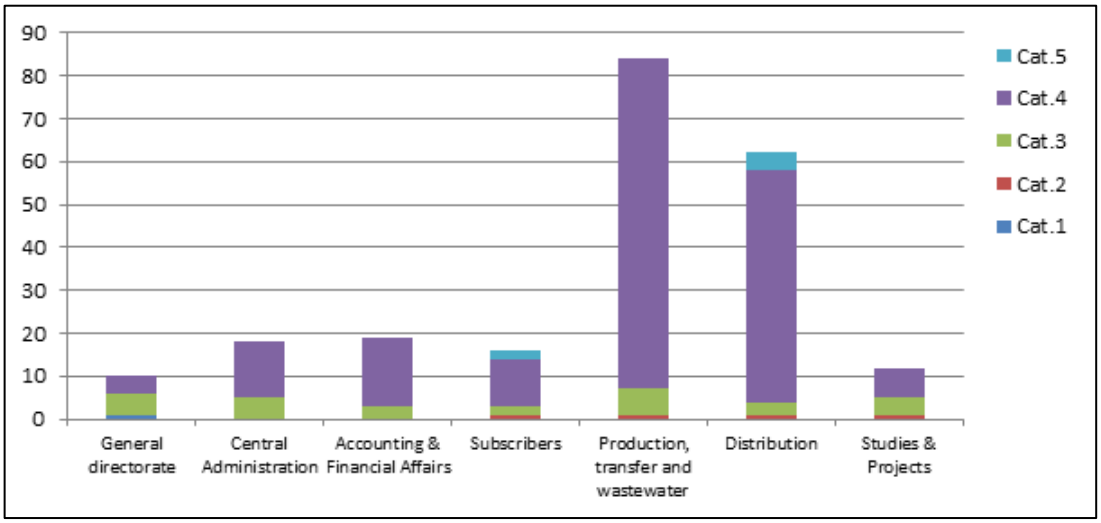

Figure C 24 Permanent staff positions per department and per category

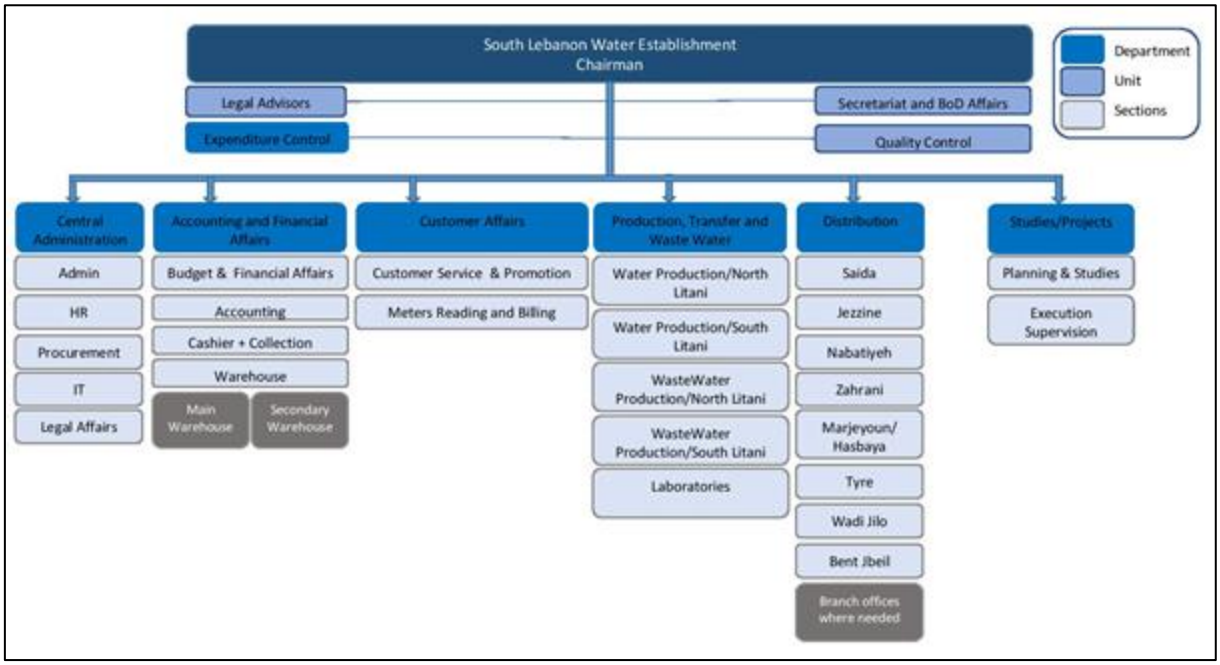

Figure C 25 SLWE's organizational chart

Permanent Staff's key challenges at the SLWE

The SLWE's operating structure is based on six main Departments - Central administration, Accounting and Financial Affairs, Customers' Affairs, Production, Transfer and Wastewater, Distribution and, finally, Studies and Projects. The SLWE has a central Customers' Affairs Department. The Production, Transfer and Wastewater, and the Distribution Departments have local units consisting of branch offices for SLWE.

The distribution of staff is broadly consistent with the size and missions of the departments:

- The Production, Transfer and Wastewater, and the Distribution Departments have offices that cover the entire region and conduct regular interventions in the field. They, thus, have the biggest number of staff members, particularly task execution employees (under category 4). However, the number of management staff is very low, which means the Units Manager has to supervise a large number of employees and, as a result, lacks the time to carry out their reporting and service quality monitoring activities. In addition, as a result of the lack of staff within the Departments, management (categories 2 and 3) and support (category 3) staff have to perform administrative tasks directly, which also reduces the time they have available to spend on team management.
- The other departments have fewer staff, which allows for a better balance between management, support and execution functions.
- The SLWE is the only WE with a specific Subscribers Department which allows overall monitoring of customers.
- Wastewater management is part of the Production, Transfer and Wastewater Department. The SLWE is the only WE that includes wastewater in its organizational chart. However, the water

establishment is not in a position to recruit enough skilled staff for its local distribution teams and for its Technical Department. Staff recruitment for wastewater management is even more difficult and the direct management of facilities is not possible under the current situation. It is, therefore, a priority for the WE to strengthen its system for recruiting and overseeing private operators.

- There is no specific monitoring and reporting team, with the exception of the Statistics and IT Department. Therefore, creating a specific unit to conduct proper data processing and reporting on service management (from production to the end-users) would be worth the while.

C.1.5.2 Temporary staff

In response to the permanent staff recruitment freeze, and to fill some of the staffing gaps, the water establishment hires temporary staff (i.e. daily contractors). The qualifications, profiles and main positions of these temporary staff have been assessed to supplement the WE's HR status review.

The WE hires a large number of temporary staff (677 temporary staff members compared to 221 permanent ones). Temporary staff members include daily contractors who may work full or part-time at the WE. It is difficult to conduct an analysis of their positions as there is no data on the volume of work they carry out. Nevertheless, the number of temporary staff used provides an insight into the gap that the WE is trying to fill.

The general qualification of temporary staff is rather high:

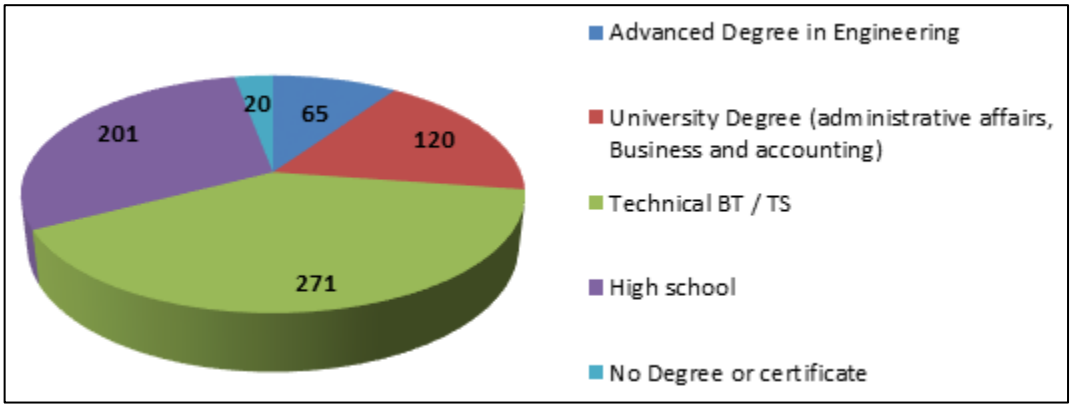

Figure C 26 SLWE's temporary staff qualifications

The management sought to recruit engineers and university graduates. The engineers recruited since the management's appointment have replaced some of the temporary staff, but the WE's limited budget hinders their ability to recruit more highly qualified staff.

The main positions held by these staff members are as follows:

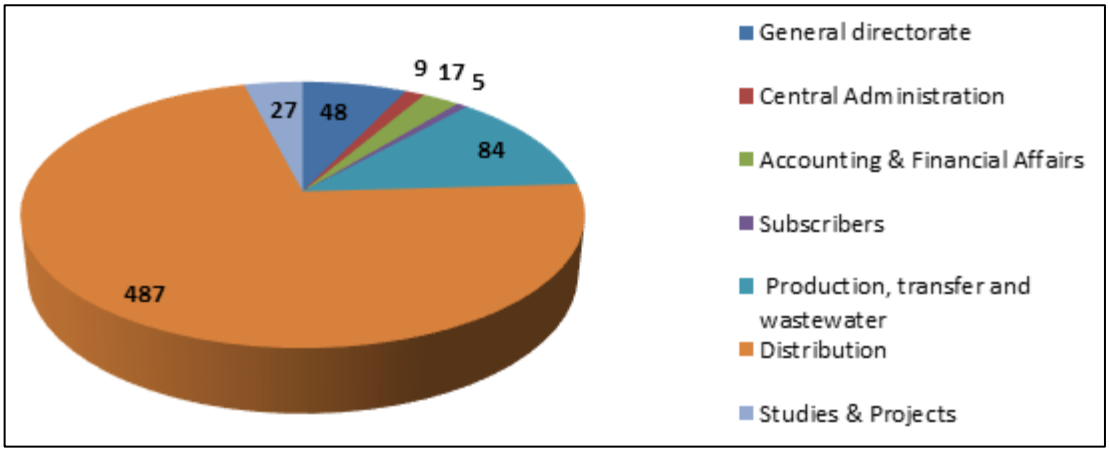

Figure C 27 SLWE's temporary staff positions

Analysis of the information available on temporary staff resulted in the following findings:

- The majority of temporary staff members are recruited to work in the waterworks/treatment plants, and in operation and maintenance activities in local teams;
- Temporary workers also include cleaning staff, drivers, guards, among others, which put into relative perspective the large number of recruited provisional staff, compared to the headcount of permanent employees.
- Faced with the issue of highly qualified and high category staff whose work is unsatisfactory, the WE seeks to recruit temporary workers to conduct strategic or higher level tasks.

C.1.5.3 Focus on engineers

Detailed profiles of the WE's permanent and temporary engineers are not available. From the various interviews conducted, it appears that the establishment currently has few qualified engineers on water management. Only one engineer is specialized in hydrogeology. In addition, the establishment has two engineers specialized in wastewater management.

The distribution of the 17 permanent engineers within the WEs' Departments is as follows:

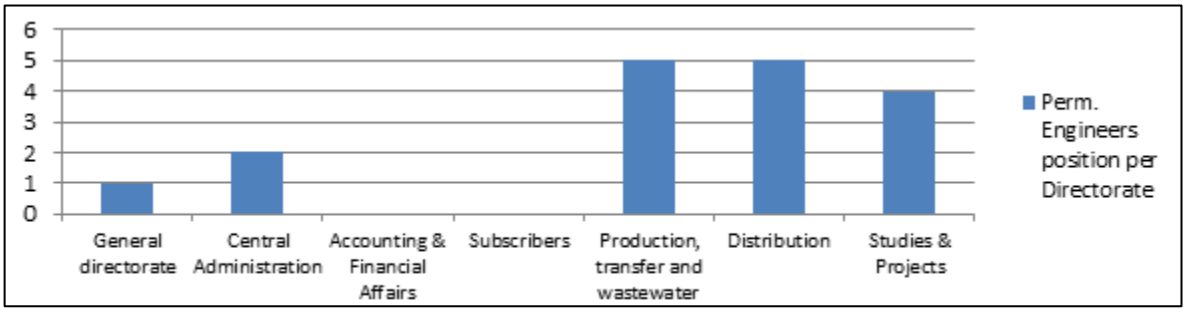

Figure C 28 Positions of permanent engineers per Department

Details regarding positions of temporary engineers are not available, but permanent engineers (17) and temporary engineers (65) make up 9% of the total headcount, which is low considering the technical activities that the WE has to carry out.

C.1.5.4 Main findings and conclusions

The first finding is that the SLWE's Organizational Decree is based on direct management of the facilities, as for the other WEs. However, the staffing situation makes it difficult for the WE to carry out these direct management tasks. The recruitment freeze means that the initial thinking behind this organizational decree needs to be reviewed. Private contractors, especially for wastewater treatment, currently operate some facilities, but the contracting framework should be reviewed in terms of developing performance-based contracts and strengthening the internal skills of the WE for the contracts' preparation and supervision.

The SLWE has made a major effort to recruit qualified staff, particularly engineers, to compensate for the freeze on recruitment by the public sector. However, it is recommended to recruit more technical expertise in the fields of water as well as data management and monitoring.

The new management launched an internal reorganization of the establishment allowing the implementation of a new development strategy. The reorganization of the WE is essential. However, it would be better and more efficient to conduct this reform progressively, rather than rushing to define an exhaustive organizational chart. The WE needs to be restructured in accordance with the skills of the permanent staff members, while taking into consideration any gaps to prioritize recruitment.

Finally, it seems necessary to strengthen the WE's management structure by recruiting high-level staff. This is aligned with the recruitment of engineers and the internal reorganization of the WE. The recruitment of staff with university or business school degrees is also crucial to develop a customer-based strategy and improve service management.

C.1.6 OVERALL FINDINGS AND RECOMMENDATIONS

C.1.6.1 General findings on the WEs' HR status

An average of only 23% of the positions defined in the decrees are occupied by permanent staff within the four WEs (20% for NLWE, 12% for SLWE, 37% for BMLWE and 23% for BWE). All WEs recruit temporary staff to fill some positions but the sum of permanent and temporary staff combined only covers 50% of the planned positions (49% in NLWE, 51% in SLWE and 52% in BWE).

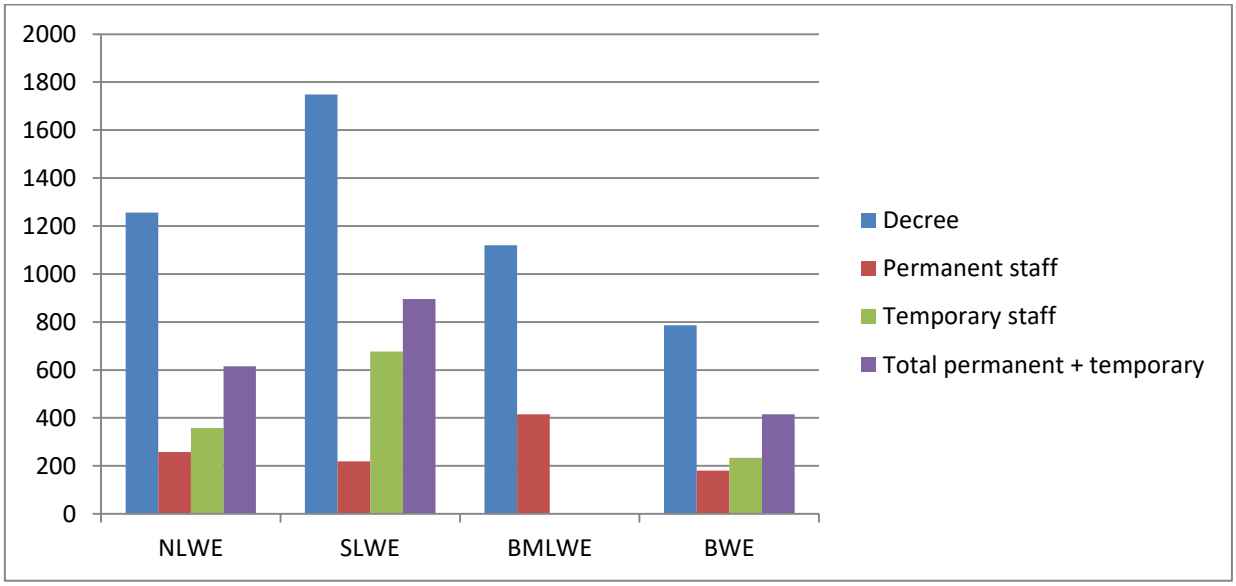

Figure C 29 General overview of WEs staff

Data on BMLWE temporary staff was not available.

All WEs face the same challenges with regard to their permanent staff structure:

- Staff are mostly low qualified;

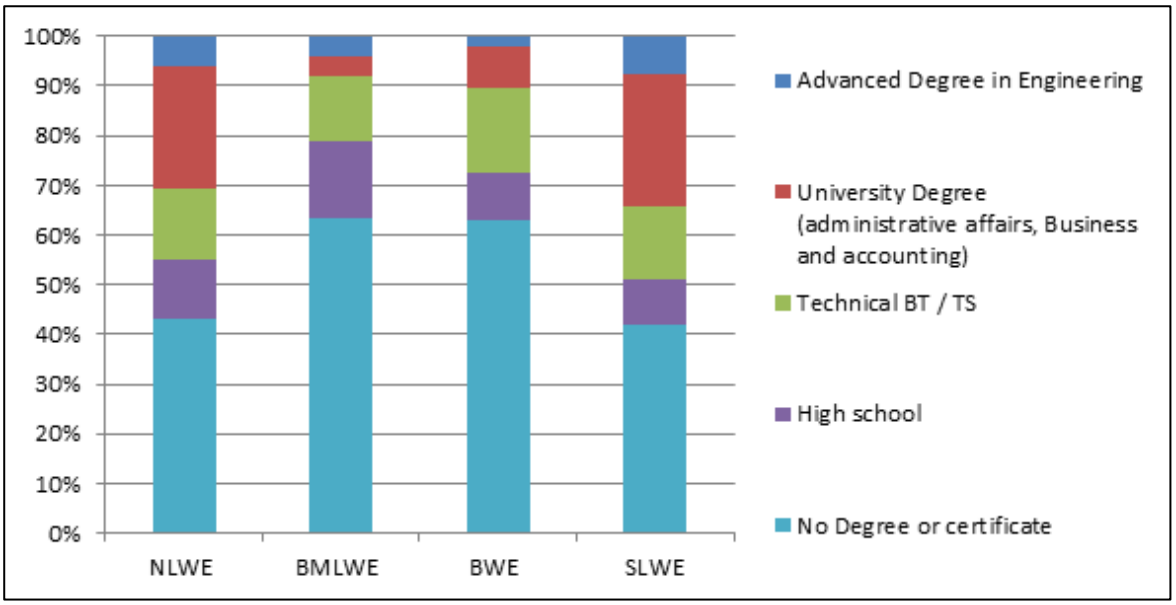

Figure C 30 Overview of the WEs' staff qualifications

- The majority of staff fall under category 4, which is not a management category;
- There are not enough categories 1 and 2, and top-level qualified staff;
- There are also few category 3 employees which occupy middle-level management positions, to effectively supervise all staff under categories 4 and 5;

- The management pyramid is partially coherent (although weak) at the central WE level, but it is unstructured and sometimes non-existent in the local teams/units.

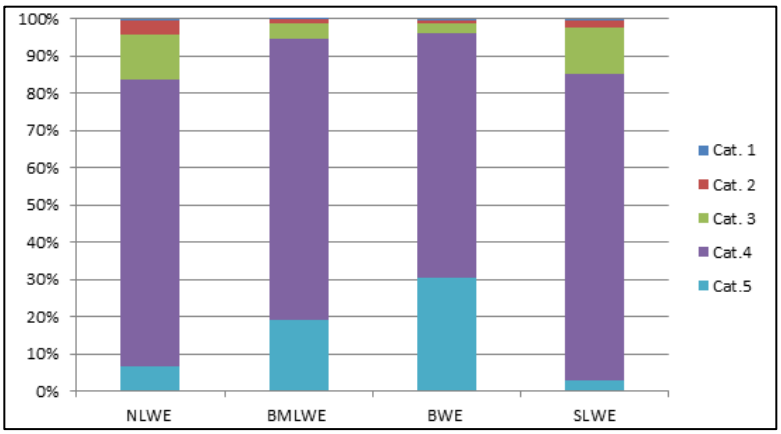

Figure C 31 Overview of the WEs' staff categories

The breakdown of category 4 and category 5 staff within the WEs is as follows:

NLWE	BMLWE	BWE	SLWE
84% of permanent staff	94% of permanent staff	96% of permanent staff	85% of permanent staff

The breakdown of category 1 and category 2 staff within the WEs is as follows:

NLWE	BMLWE	BWE	SLWE
11% of permanent staff	5% of permanent staff	2% of permanent staff	4% of permanent staff

This structure poses a major team management challenge for the WE. As there are 20 to 30 staff per manager (which includes category 3 managers and assumes that all highest category employees are able to manage teams), staff in higher categories do not have the time to carry out their strategic functions.

Consequently, this restricts the WEs internal capacity to develop strategic analysis, planning or to have a specific high-level taskforce to oversee and monitor services and internal WE performance.

In terms of organization, all WEs have five main departments:

- the General Directorate whose departments and units are in charge of internal quality control management;
- an administrative department (including HR, legal and procurement);
- a financial department;
- a technical department in charge of production, studies and projects;
- an exploitation or distribution department.

Only the SLWE has a specific subscribers' department.

The main findings with regard to reorganization requirements are as follows:

- The organizational charts contain no clearly identified communication team or unit;
- There is central customer management in the North and Beirut;
- There is no clearly identified monitoring and reporting management team or department, which particularly needs to be created and staffed following the implementation of SCADA systems (in Beirut and Bekaa and soon to be introduced in the South);
- There are no departments or teams for wastewater management and irrigation, despite these still falling under the WEs' remit according to Law 221.

Within each WE, staff allocation per the current main departments is as follows:

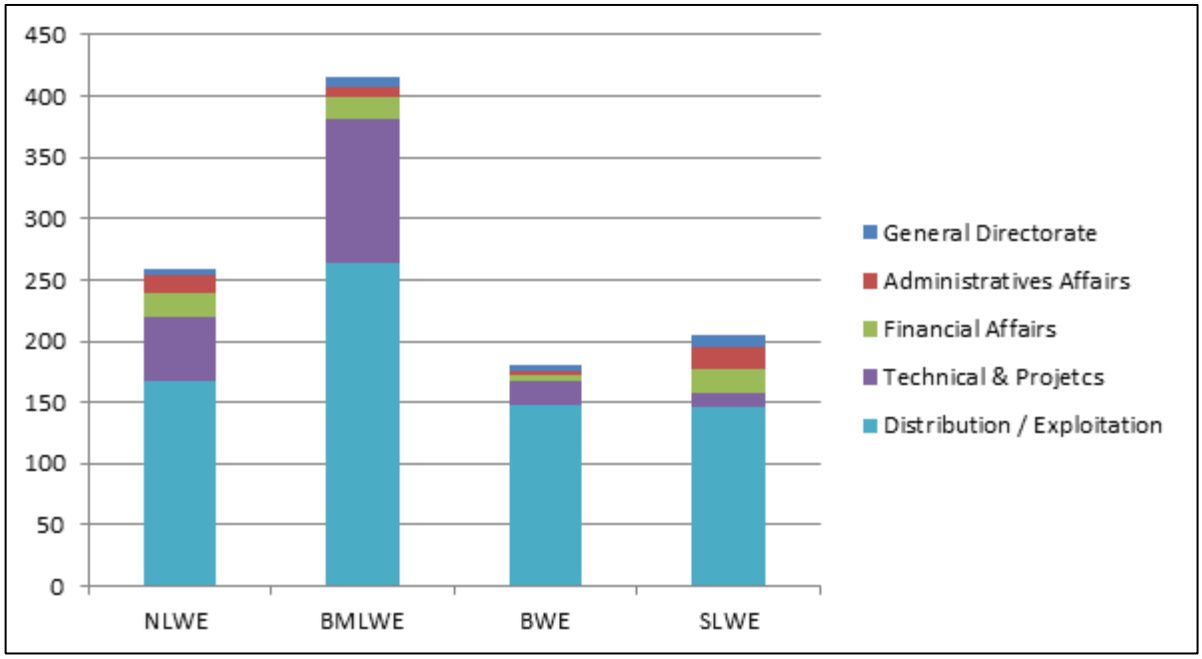

Figure C 32 Staff allocation per main Department

The distribution/exploitation departments contain an average of 70% of the WEs' total permanent staff who work across each concerned area of activity:

NLWE	BMLWE	BWE	SLWE
64% of permanent staff	63% of permanent staff	82% of permanent staff	66% of permanent staff

The technical, as well as the projects and studies departments comprise an average of 16% of the WEs' total permanent staff:

NLWE	BMLWE	BWE	SLWE
20% of permanent staff	28% of permanent staff	11% of permanent staff	6% of permanent staff

It is quite clear from these figures that the current structure of the WEs is based on direct service-management activities, which is confirmed by the number of staff specified in the Organizational Decree of each WE. However, the reality of the staffing situation makes it extremely difficult for the WEs to properly carry out these direct management functions.

In order to fill gaps generated by understaffing, the WEs hire temporary staff (i.e. daily contractors). There is no data available for the BMLWE, but for the NLWE and the BWE the main positions held by these daily contractors are as follows:

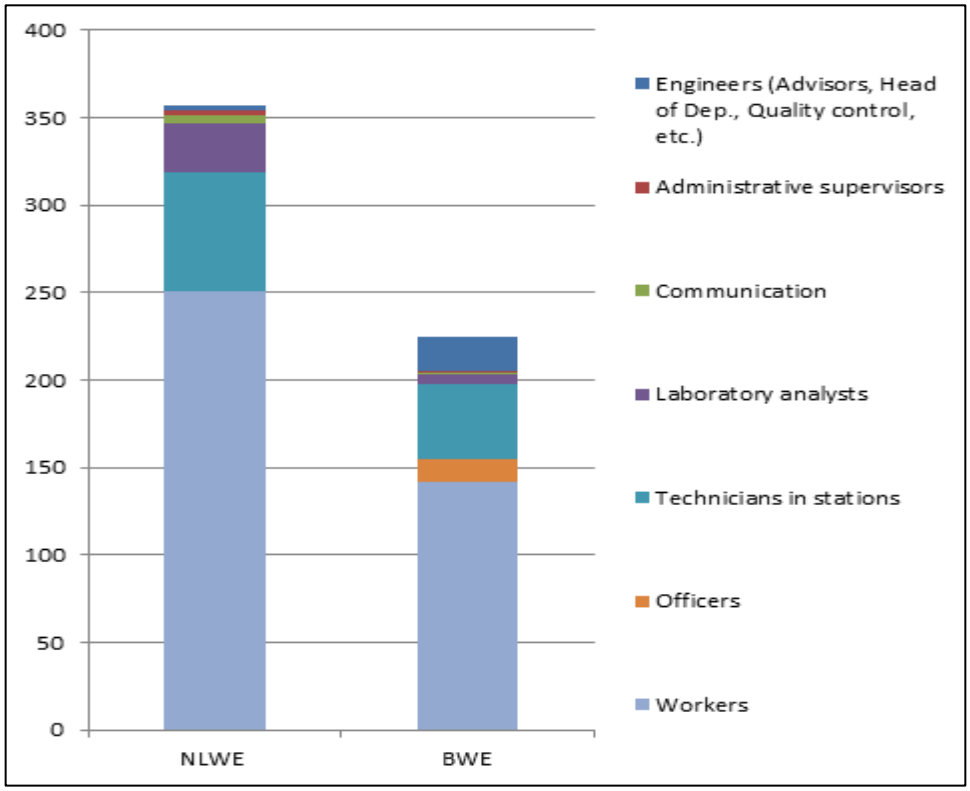

Figure C 33 Main positions of the WEs' temporary staff

These temporary staff members mostly work within the technical and exploitation/distribution departments (which is also consistent with the SLWE data on temporary staff), confirming that the WEs are seeking to fulfil their mission of directly managing some of the facilities.

The lack of financial resources and budget also prevents the WEs from recruiting highly qualified staff members to fill senior positions. The low number of engineers in the WEs is a strong indicator of these constraints with the exception of the SLWE that has recruited a significant number of engineers.

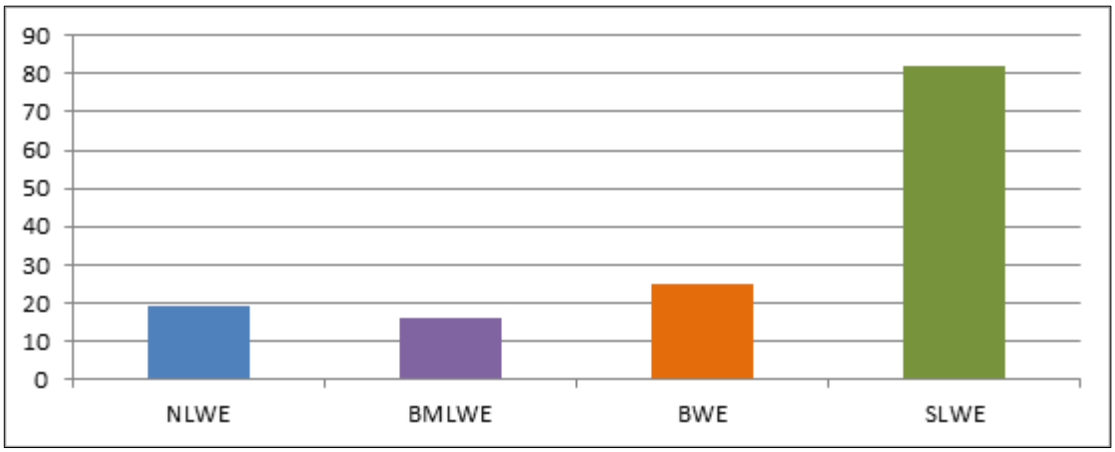

Figure C 34 Number of engineers in each WE

Engineers (including temporary staff for the NLWE and the BWE) account for an average of 9% of the WEs' total staff:

NLWE	BMLWE	BWE	SLWE
3% of permanent staff	4% of permanent staff *(excl. temporary staff- data unavailable)*	6% of permanent staff	9% of permanent staff

Their profiles are as follows[1]:

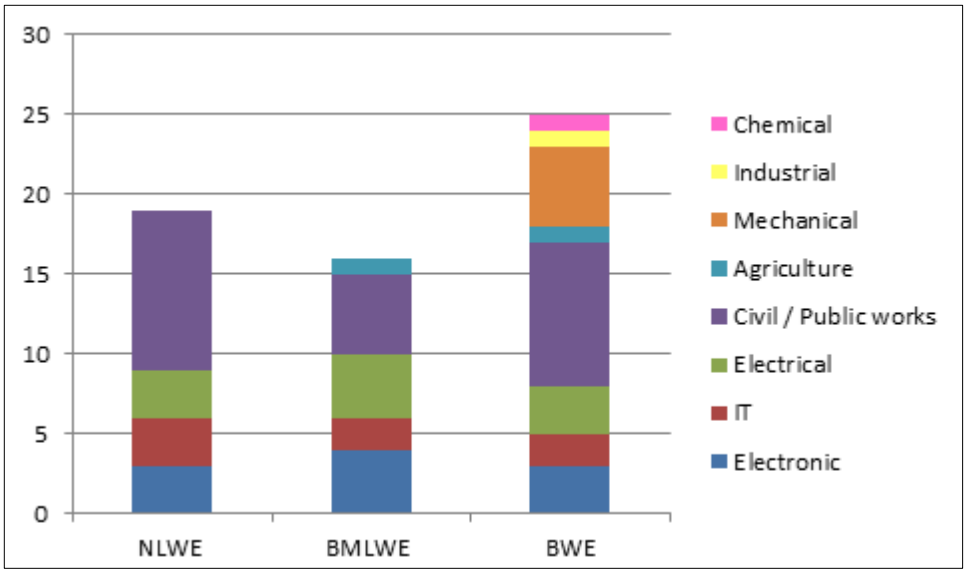

Figure C 35 Profiles of the WEs' engineers

[1] Data is not available for SLWE

It is striking to note that none of the water WEs has engineers specializing in hydraulics, hydrogeology, water management, sanitation, irrigation or the environment among its staff members.

There are two potential hypotheses for this:

- There are not enough graduates in the sector and newly graduated engineers will develop their experience abroad;
- The private sector offers better employment conditions for engineers with these profiles (better opportunities and better salaries) and the WEs' situation means they are unable to compete with the private sector.

In both cases, it is essential for the public sector to find the right incentives to attract staff with these engineering profiles. Thus, a theoretical priority recruitment projection of thirty to fifty engineers for the four WEs and the Ministry seems relevant as the sector needs highly technically-skilled engineers who are experts in wastewater, water resources management, water supply, environment, IT/statistics/GIS, data collection, monitoring software management and water metering, among others. As it is unclear whether engineers with such profiles are currently available in Lebanon, it would perhaps be useful to conduct a labor market analysis in the water and wastewater sector, as well as for public utilities management (including customer relations management) in order to produce a consistent recruitment plan.

C.1.6.2 Summary of common challenges

Overall, WEs are confronted with a very challenging situation:

- Their internal structure (as defined by their organizational decrees) is moving toward the direct management of facilities and services;
- However, they are unable to recruit the required staff, in accordance with the specific decrees, to accomplish their mission or to even replace retiring employees, as there is a freeze on all recruitment through the Civil Servant Council;
- They fill the gaps partly through existing teams, but some are underqualified or underpaid for certain tasks and others end up carrying out execution tasks instead of working on technical and strategic areas;
- They also recruit temporary staff, but this poses challenges around the sustainability of their position and the difference in status with permanent staff;
- They have to manage wastewater and irrigation but their current organizational chart and staffing plan defined by the organizational decrees do not include these services (no dedicated department or team nor staff members with specific qualifications and skills listed), which means that, not only are they already understaffed and/or inadequately staffed for delivering water supply services but they also have to provide two other challenging services;
- They should be involved in designing and supervising the water, wastewater and irrigation projects implemented in their region but they do not have enough skilled staff to be involved in these projects;

- They need to outsource some of their tasks to private operators, but lack an efficient and effective contracting framework and internal technical skills to properly supervise private operators.

As reference documents for the organization of each WE, the organizational decrees and staffing plans of each water establishment reinforce the perception of understaffing, as does each WE's internal HR management. However, analysis of the WEs' HR situation reveals that the problem is not only understaffing, but also inadequate staffing and poor team management.

Thus, in all institutions, the priority is to review organizational decrees which are all outdated (even for the NLWE) and no longer aligned to the WEs' mission or to the opportunities for developing service management in the coming years, rather than trying to achieve them,.

C.1.6.3 Main recommendations

All of the organizational charts are outdated, even the NLWE's recently revised one, and require revision. Defining staffing levels based on options for managing facilities and services is not appropriate and flexibility is necessary to help the WEs develop on several levels, including:

- Improving the management of their current functions (i.e. enhancing the water service and developing customer relations);
- Managing wastewater facilities;
- Developing irrigation-related activities;
- Developing structured service monitoring and enhanced reporting.

The validation of the WEs' internal organization is carried out at a very high level (decree issued by the Council of Ministers) which removes any flexibility from these provisions. Yet, the priority for the WEs is to gradually reform themselves and create their organizational charts as they progress. Thus, it would be much more effective and efficient to simply list the main departments to be found in each WE in those organizational decrees. Furthermore, each institution should be granted the flexibility to gradually organize these departments as it sees fit and change its organizational charts over time, without being dependent on decisions taken by the Council of Ministers.

Thus, all organizational decrees need to be revised, and their scope needs to change as follows:

- Instead of pre-defining an operating model, it would be more useful to allow WEs the freedom to develop the most appropriate service management model: direct management of certain tasks and delegation to the private sector for other identified tasks. It would be counterproductive to delegate tasks to the private sector that the WEs are currently performing effectively (an analysis must be carried out for each WE).
- It would also be more efficient to include less detail in the organizational decrees (i.e. number of staff and precise organizational set-up of the WE) as the procedure for adopting these decrees is cumbersome (adoption by the Council of Ministers) and hinders the WEs' ability to develop their organizational charts in line with their evolving needs. Instead, the organizational decrees could set out the main orientations (strategy, results and performance-based management approach, staff recruitment thresholds… etc.).

- Finally, in order to develop the sector, it seems more effective to focus these decrees on monitoring the WEs' performance. Thus, the organizational decrees could list the key performance indicators to be developed and monitored, and could refer to annual agreements between the MoEW and the WEs without having to go back to the Council of Ministers to indicate values consistent with the situation of each water establishment.

Consequently, the main actions to be undertaken include:

- Carrying out a thorough diagnosis of the WEs' and LRA internal capacities in order to:
    - Identify the WE's performance areas and the tasks or activities for which they require internal expertise; define the profiles of the staff to be recruited or identify the internal staff to train.
    - Identify the activities or tasks to be outsourced to private operators for each WE.
- Reviewing the private operator contracting framework and providing WEs with greater flexibility for procurement; this includes supporting and developing the WE Procurement Units and their internal technical skills to supervise contracts and monitor private operator performance.
- Defining a performance-monitoring framework, and developing monitoring and reporting tools and processes; this includes supporting the MoEW with developing a monitoring unit.
- Defining mechanisms to encourage performance improvements and sanctioning non-compliance with reporting and transparency procedures.
- Providing greater flexibility to the WEs and LRA to define their HR needs and carry out the necessary recruitment;
- Reviewing the organizational decrees of all WEs and the LRA.

C.2 THE LITANI RIVER AUTHORITY

C.2.1 LRA HR STATUS

Established in 1954, the LRA has specific functions and roles related to hydroelectricity and dam operation and maintenance, as well as irrigation activities in the Litani river basin. The LRA is also responsible for monitoring all surface water resources nationwide.

To perform these functions, the LRA developed an organization chart in 1976 based on 512 positions. However, the Council of Ministers has never endorsed the related decree. The organizational chart was, therefore, adapted to go in line with the new projects assigned to the LRA and was validated by the LRA's board members. However, it was never formalized by decree by the Council of Ministers.

There is little data available about the LRA, but the main figures are as follows:

No. of proposed positions	Permanent staff currently in position	Current temporary staff
512	128	70

The permanent and temporary staff in position account for only 39% of the staff necessary to ensure the proper functioning of the authority.

The LRA has a reputation for being an efficient organization. It employs 35 engineers (29 permanent and 6 temporary), which is a significant number, and enables the LRA to ensure a standard performance.

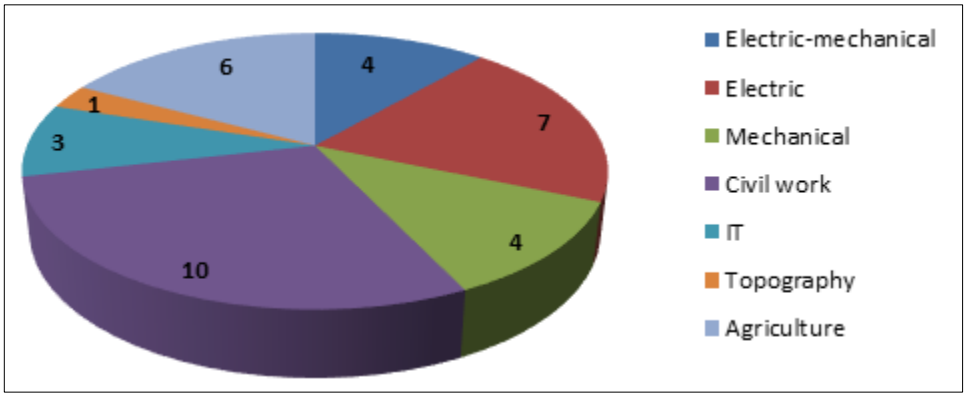

Figure C 36 Profiles of LRA engineers

They work within the three main technical directorates of the LRA, namely the Technical, Irrigation operations and Hydroelectric operations directorates.

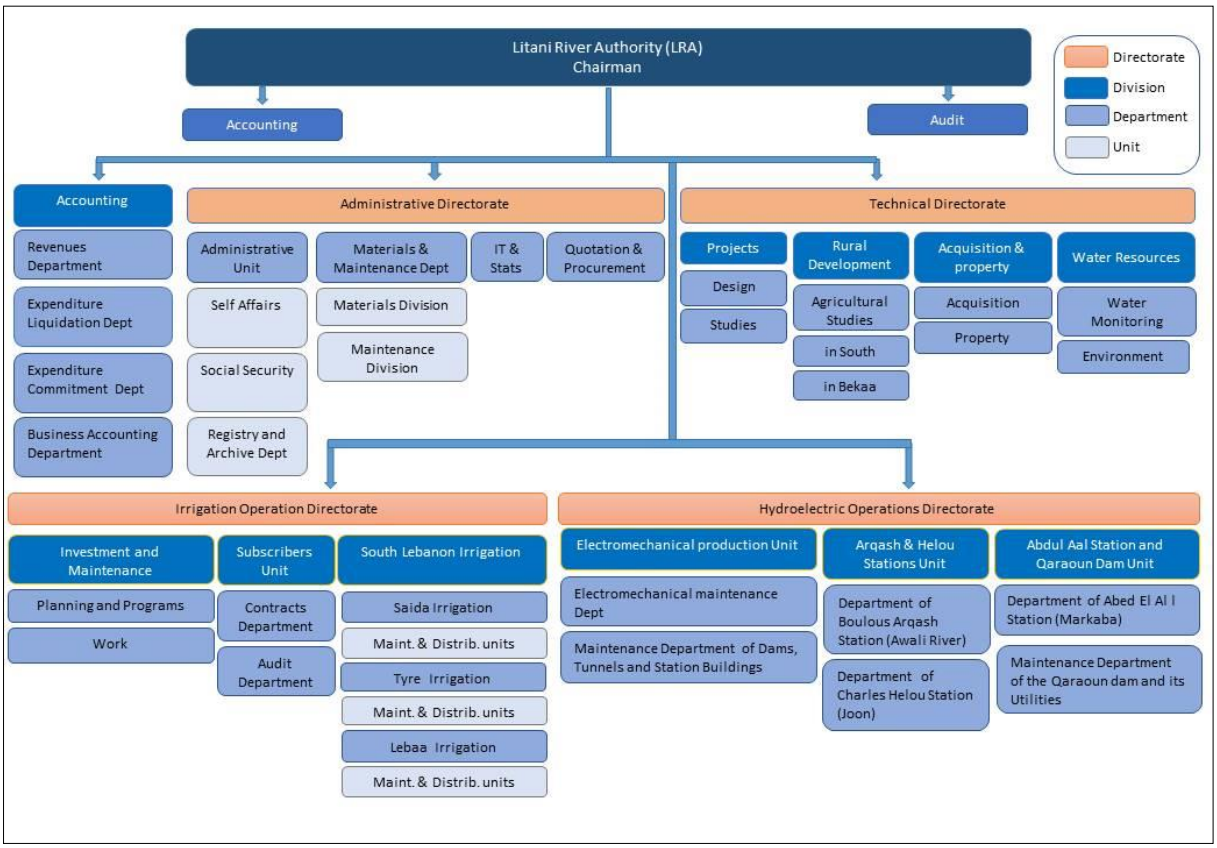

Figure C 37 LRA's organizational chart

The technical staff mostly work in the technical and hydroelectric operations directorates (around 70% of them). Only 30% of the technical staff members are under the irrigation operations directorate, which is a rather low percentage. LRA faces challenges due to understaffing. Due to staff retirement and the recruitment freeze, the authority has seen its workforce drastically shrink in numbers in recent years.

The LRA-defined permanent headcount trend between 1996 and 2025 is set out below and includes retirement and non-replacement figures.

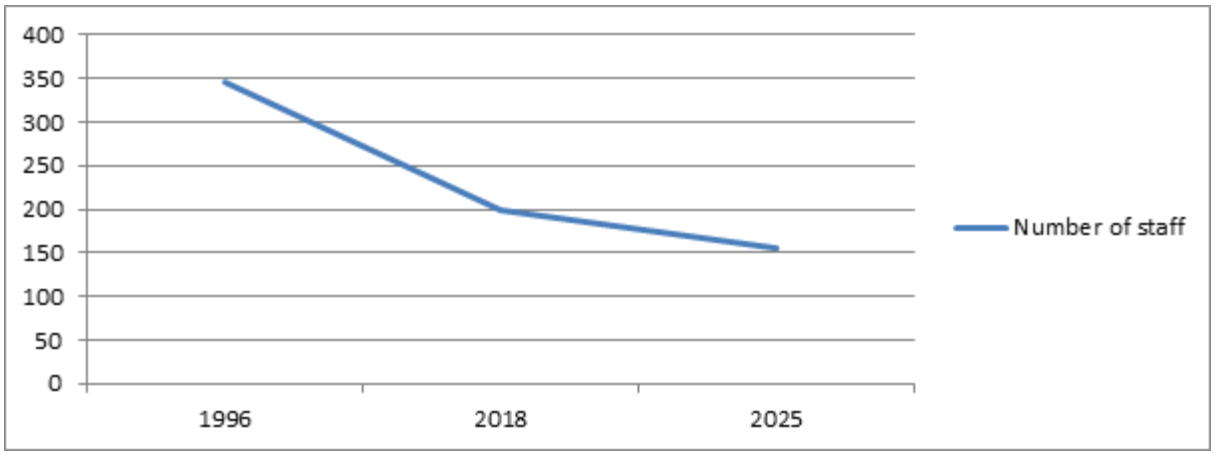

Figure C 38 LRA's headcount trend since 1996 and projection to 2025

While 346 employees were working at the LRA in 1996, only 198 are currently occupying positions at this same institution. This figure is soon set to fall to 155 permanent staff if no measures are put in place to replace permanent staff who retire.

C.2.2 MAIN FINDINGS AND RECOMMENDATIONS

Despite having technical staff in place and less understaffing than the WEs, the lack of staff members remains a challenge for the LRA. This is witnessed in the:

- lack of staff in the irrigation department;
- non-replacement of permanent employees who have retired; this has led to a 43% reduction in the permanent workforce over the last 20 years, a figure that is set to rise to 55% by 2025.

It is therefore crucial for the LRA's development that measures are implemented to offset these departures and to plan the recruitment of additional permanent staff. A specific HR diagnosis should be conducted to identify needs and define an HR development plan.

The LRA teams also argue that the monitoring of surface water outside the Litani basin, currently assigned to the LRA, should be transferred to the ministry.

Finally, the teams point out that their organizational chart has never been formalized by a Council of Ministers' decree. However, this allows the LRA to adapt its structure to new projects or new tasks without causing any major obstacles. Although unconventional, such an approach provides greater flexibility and should be used in the review of the WE organizational decrees.

C.3 CAPACITY-BUILDING

Some of the Lebanese government's partners, such as the European Union and the USAID, have an extensive experience in providing capacity-building and support to the sector.

The chart below shows the main programs implemented since the adoption of Law 221 and the creation of the WEs:

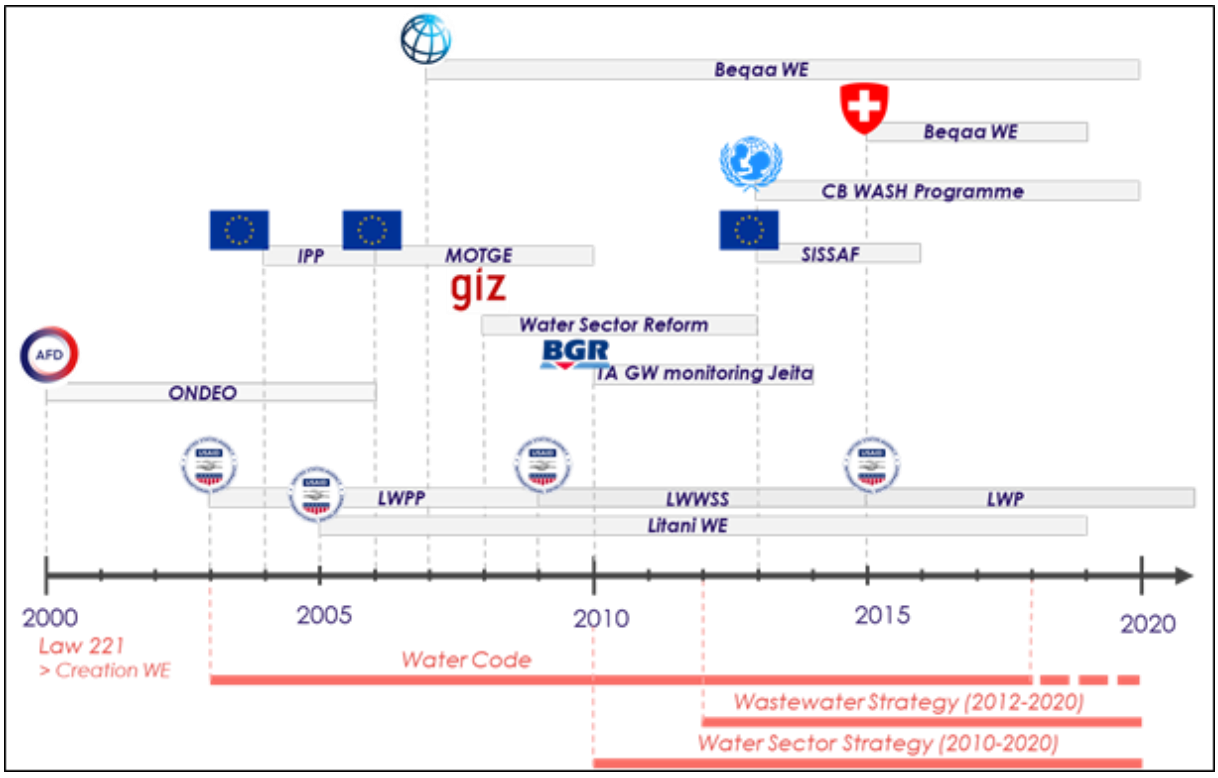

Figure C 39 Overview of the water sector's capacity-building programs implemented in Lebanon

The sector benefits from a wide range of capacity-building programs and projects, and from the long-term involvement of stakeholders such as the EU, the USAID or the World Bank.

The ONDEO program is one example as it has helped improve the skills of the NLWE's staff and provided an insight into the challenges involved in developing partnerships with the private sector (contracting framework, private sector areas of intervention, structuring of the partnership with the institution… etc.).

C.3.1 OVERVIEW OF THE MAIN PROJECTS

C.3.1.1 Main EU-funded projects

The EU has a relatively long history of providing technical assistance and sector support since the first support programs date back to the early 2000s and focused in particular on assisting institutions to become operational after the reforms triggered by Law 221-2000.

MOTGE, a project to implement technical tools for water management

The MOTGE project implemented from 2006 to 2010 was based on a previous project to support sector stakeholders. The MoEW's General Operations Manager managed the project with the support of an internally recruited advisor and an external consultant.

The general objectives of the program were to:

- Guarantee the quality and continuity of the services for which the sector is responsible (drinking water, irrigation and sanitation), as well as ensure the access of users to these services;
- Ensure the protection and renewal of natural resources (surface and groundwater);
- Ensure the financial autonomy of the water sector.

The achievement of these objectives was based on implementing the technical management tools delivered to water establishments by previous projects and by this program (IWRM, GIS, CMMS, customer management software), as well as on consolidating these tools at the national level and ensuring the sustainability of their implementation.

The resources involved include TA for training (short-term), long-term TA to the WEs and to the Ministry, and the funding of some WE staff.

The evaluation showed that the project only partially achieved the expected results, in particular because the program was very ambitious given the very limited skills of the WEs. The main limitations and lessons learned are as follows:

- Project management was too centralized within the MoEW and distant from the WEs;
- The WEs had little involvement in defining needs and selecting the software provided by this project and the previous program (some of which still currently remain unused);
- There was a lack of flexibility in activity implementation and rigorous monitoring of the TA's ToRs, which did not match the real needs of institutions;
- There was a lack of transparent communication between stakeholders;
- There was a lack of transparency in sector data management.

SISSAF, Support Programme for Infrastructure Strategies and Alternative Financing

The SISSAF program, implemented between 2013 and 2016, is the most recent example of sector support provided by the European Union. The objectives of the program were to:

- Improve the efficiency and effectiveness of services and financial sustainability in the Lebanese infrastructure sectors - energy, water and land transport;
- Improve the effectiveness of aid provided to these sectors.

The program aimed to support ministries (and WEs) to implement sector strategies by prioritizing budgets and projects in collaboration with international donors.

The expected results were to:

- Improve sector monitoring in order to prioritize investments on an objective basis;
- Strengthen sector coordination;
- Define a list of priority projects and promote their implementation by the donor community;
- Organize technical visits for sector stakeholders;
- Monitor overall sector, program and priority projects' impacts.

The mid-term evaluation conducted in 2015 produced the following findings:

- Implementation of the sector reform (full application of Law 221-2000) was incomplete, a situation that increased tensions between the MoEW and the WEs;
- MoEW was understaffed;
- Sustainability of the program's results was limited by the fact that activities could only target non-permanent teams of the TGM (advisers) instead of focusing on civil servants;
- Sector data was incomplete, inconsistent and unreliable;
- The list of priority projects lacked coherence and could not be perceived as a tool for implementing the reform.

The observations made and lessons learned by the SISSAF teams, the MoEW and the EUD involved meeting the following needs:

- Balancing the approach between the MoEW and WEs in any project;
- Focusing on the permanent teams of the MoEW and WEs in order to improve sustainability of the results of the implemented actions;
- Building a global vision for formulating strategies and implementing reforms that is shared by all sector and long-term stakeholders.

C.3.1.2 Projects implemented with the support of USAID

USAID has been working in Lebanon for about fifteen years providing capacity-building for water stakeholders.

The first interventions of the American agency in the early 2000s targeted municipalities, financing 40 wastewater treatment facilities. However, after strong criticism from both the MoEW and the CDR, and the limited results of these projects, USAID, then, redirected its efforts towards supporting the MoEW and the WEs, and implemented several structuring programs:

- The Lebanon Water Policy Program (LWPP) implemented between 2003 and 2009, which focused on supporting the MoEW and WEs to implement the reform. Partners executed actions such as consolidating the SLWE (setting up an ERP, monitoring unbilled water, defining a five-year business plan incorporating planned investments and corresponding tariffs, and defining water and

sanitation master plans) and supporting the BMLWE in the development of a business plan and a cost recovery model.

- The Lebanon Water and Wastewater Sector Support (LWWSS) project, implemented between 2009 and 2015, which aimed to continue the work undertaken in the LWPP and extend it to other WEs. The project implemented supporting activities for laboratories in the Bekaa and the South, deployed ERPs in other WEs, trained WE teams and defined five-year business plans, developed a performance measurement-based approach, and, finally, trained the operators of water supply systems on improving hygiene practices.
- The Lebanon Water Project (LWP), being implemented since 2015 to 2020, focuses on building resource management capacities and improving water service efficiency and sustainability through technical assistance. It involves defining risk management plans, implementing private sector engagement approaches - agreements between WEs of the South, the Bekaa and the North with Cash United, for the free and remote payment of the water bill - and demonstration projects in conjunction with municipalities - volumetric metering on closed networks, natural sanitation, user awareness, implementation of chlorination systems, and development of renewable energy use.
- In addition, for the past ten years, USAID has been running a dedicated support program for the LRA to protect the river's resources (working closely with the municipalities in the basin, raising user awareness, focusing on irrigation, setting up demonstration projects… etc.).

The main benefit of USAID's work is that it is long-term and adapted to the results of each past program. Despite very positive results, some limitations remain, such as the lack of ownership by some WEs of the software provided due to lack of internal capacities, and approaches that are sometimes hampered or blocked by a supposedly lack of political will to make progress on certain parts of sector reform.

C.3.1.3 GIZ - Water Sector Reform Assistance Project

The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) implemented the Water Sector Reform Assistance Project from 2008 to 2013, which produced interesting results for sector support programs.

This project, the aim of which was to improve water and sanitation services in Lebanon, had three components: building MoEW capacities to support and regulate WEs; growing the technical and managerial capacities of the four WEs; and improving WE customer relations.

The project has made it possible to develop certain tools that are still currently being used by WEs (business plans in the North and South, and customer management center in Saida), as well as pilot approaches that have been adopted by sector stakeholders (implementation of volumetric meters). Other tools developed by the project would benefit from further work with the MoEW and the WEs, in particular the WE performance indicators, the WE data collection and management procedure, and the standardized WE annual report template.

The main findings of this project are as follows:

- The 6-year implementation period was considered short in light of the challenges posed by the reform and the support to be provided to stakeholders (in particular, building the capacities of the WEs);
- There were concerns over the sustainability of the results due to the lack of sector regulation and the low levels of communication and consultation between the WEs and the MoEW (good ownership of business plans by some WEs but no certification of the plans reviewed by the MoEW, for example) and between the TGM and the CDR on investment planning;
- Sector support projects must include an exit strategy to strengthen sustainability conditions;
- Donor coordination has had beneficial impacts, as GIZ and USAID have used the same consultants for similar interventions to ensure consistent results;
- The implementation of discussions between the WEs on topics defined based on requests were highly appreciated by the beneficiaries.

C.3.1.4 UNICEF WASH Program

UNICEF has been supporting the sector since 2013 through the WASH Program, which focuses on three areas: emergency, stabilization and capacity-building. On this third axis, UNICEF supports the MoEW by funding existing posts (including those of a groundwater resource expert and communication specialist) and supports the WEs through the recruitment of specific experts (hydraulic experts in BWE, and NLWE and communication experts in all four WEs).

The WASH Program has resulted in specific studies being carried out on the state of groundwater resources and a national survey being conducted on access to services, and has led to communication plans being defined in WEs. Specific support was provided to the WEs to improve data collection and transmission to the MoEW for national sector monitoring.

This program is still under implementation. An evaluation covering the period 2013-2016 produced the following main findings:

- The lack of communication between the MoEW and the WEs is having a negative impact on activity implementation;
- The experts appointed to the WEs struggle to focus only on the tasks for which they were recruited. They are often diverted to other tasks due to lack of resources in the WEs;
- The flexibility of the program provides great added value and has made it possible to achieve results that have proved useful for structuring the sector (conducting specific studies).

C.3.1.5 SDC – Support for improving access to water and sanitation in Bekaa Valley

The Swiss Development Agency (SDC) has been supporting the BWE since 2015 for a period of 4 years (phase 1). The main components of the support program include: developing a system for collecting

and managing data on the WE's main activities (deployment of the SCADA system); improving the management of unbilled water and leaks on the network; strengthening the WE's capacity to operate wastewater facilities; protecting wells and springs; and installing chlorination systems.

The main recommendations made at the mid-term point of the program's implementation are to:

- Extend its implementation over the long-term (initially planned for 4 years);
- Strengthen the links between the MoEW and the water establishment - in particular for activities concerning the monitoring of groundwater resources and data management;
- Develop pilot projects to control energy costs (on the chlorination systems);
- Focus more on building the WE's current poor capacities to enable the effective and sustainable implementation of the SCADA system (the WE does not have the skills in place to manage the software, the use of which is extremely costly, and the WE has already abandoned several less constraining software applications provided by other stakeholders – i.e. EU, USAID);
- Define an exit strategy in order to strengthen the sustainability of the program.

C.3.1.6 The World Bank-supported programs and activities

In support of these projects, the World Bank is financing capacity-building actions at the BMLWE (implementation and supervision of performance-based contracts for managing leaks on the network and installation of volumetric meters). The World Bank has also worked on emergency projects in the Bekaa to improve access to safe drinking water in the most vulnerable regions and has funded three TA positions in the WE (still in position).

C.3.1.7 Specific TA support funded by the KfW

As part of its support to Lebanese stakeholders to help address the Syrian refugee crisis, KfW contributes funding to UNDP actions that support selected WEs (Bekaa, Beirut and Mount Lebanon). In addition to the sanitation project in Jeita, the German Federal Institute of Geosciences and Natural Resources (BGR) provided technical assistance for monitoring water from the Jeita spring from 2010 to 2014. However, the set-up time for infrastructure projects has been very long (work has still not started) and the alignment of the TA with the construction work phase was not ensured.

C.3.1.8 Upcoming actions in partnership with AFD

The French Agency for Development (AFD) has been active in the water and sanitation sector in Lebanon since the early 2000s. The challenges of ensuring private sector involvement in water utility management (ONDEO contract with NLWE), coupled with non-renewal of the ONDEO-NLWE contract in 2006, and national resistance to the adoption of the draft Water Code drawn up in 2003, has led the AFD to focus its intervention on infrastructure projects.

However, the AFD is currently involved in two upcoming structuring actions for the sector:

- The Qadisha Valley sanitation program, through a loan of 30 million euros to CDR, which has a strong technical assistance and stakeholder support component that focuses on facilities operation and sustainability of the service;
- The project to support sector reform funded by a delegation of EU funds aims to support capacity building of WES and MoEW for service improvement.

C.3.2 MAIN FINDINGS AND RECOMMENDATIONS

Despite the efforts made since 2000 to structure the sector and support stakeholders, the WEs' situation remains challenging. Most of the above-mentioned projects have met the same limitations:

- The lack of WE ownership of the tools made available to them: difficulties using ERP software, which has almost been abandoned by some WEs; lack of qualified staff to manage certain software (SCADA for example in Bekaa: the use of this software requires approximately 8 full-time and trained engineers and technicians, which is difficult for the WE to achieve given its recruitment constraints).
- Donors' funding of experts makes it possible to fill certain HR gaps identified in the previous chapter. However, full-time TAs working the WE teams find it difficult to focus on their initial role: due to a lack of resources and staff in the WEs, many of these TAs have been diverted from their functions to carry out more daily tasks (e.g. TA in communication fulfilling the role of assistant to the General Directors, TAs appointed to deliver technical training to teams that became "technical advisors" to the General Directors… etc.). In other cases, the execution of their role has also been hampered by internal interpersonal relationships. The relatively low long-term impact of technical visits or training due to WE understaffing. It is sometimes difficult for institutions to mobilize staff to participate in training:
    - Difficulty in mobilizing staff over time on training organized in several parts. Most of the time, different people participate in the different modules;
    - Participation of staff who do not have the qualifications and skills required to attend training courses;
    - Absence of qualified personnel who are knowledgeable about the topic and direct participation of the Director General instead of an engineer or a technician specialized in the topic (especially for training or technical visits on wastewater management).

The main recommendations are, therefore, as follows:

- Capacity-building actions must be aligned with investment planning (if possible, any infrastructure project should have a component to support the WE concerned and strengthen coordination between the MoEW, the CDR and the WE);
- In order to ensure that the WE teams take ownership of their roles, priority should be given to financing staff recruitment (based on a plan to take on payment of the employee's salary at the end of the project) and using ad hoc technical support staff rather than introducing long-term

technical assistance into the WEs. This is because these TAs end up doing the work of the staff being supported, which hinders the sustainability of the achievements beyond the project implementation period;

- Before implementing any management tool, ensure that the teams in place are able to manage the tool or that recruitment is possible (ensuring the tools developed require very little recruitment as this is extremely complex for the WEs);
- It is important to ensure there is a balance between the support provided to MoEW and WEs, and between the joint activities developed for the four WEs, and between them and the MoEW;

- In participatory support processes (for projects' coordination, consultation with municipalities or other local stakeholders, or even to support dialogue between MoEW and WEs or between MoEW, CDR and WEs) , it may be necessary to call upon external contractors with facilitation skills at certain stages in order to reduce the negative impacts of stakeholder power relations and interpersonal issues;
- In the absence of a long-term commitment to sector support, such as in the case of USAID that has been running projects and programs continuously for 20 years, it is essential for short or medium-term projects partners to define an exit strategy for all projects and programs. Such a strategy will allow the MoEW or WE to carry ownership of the projects' results and their sustainability.

C.4 INVOLVEMENT OF WES IN INFRASTRUCTURE PROJECTS' PLANNING AND MANAGEMENT

C.4.1 MAIN FRAMEWORK OF INFRASTRUCTURE PROJECT DESIGN AND IMPLEMENTATION

In the water sector, most infrastructure projects are implemented through international funding. The donors finance the CDR, who collaborates with the private sector to carry out the work.

According to Law 221 and the 2010-2020 National Water Strategy, WEs should play a central role in project planning and management, alongside the CDR:

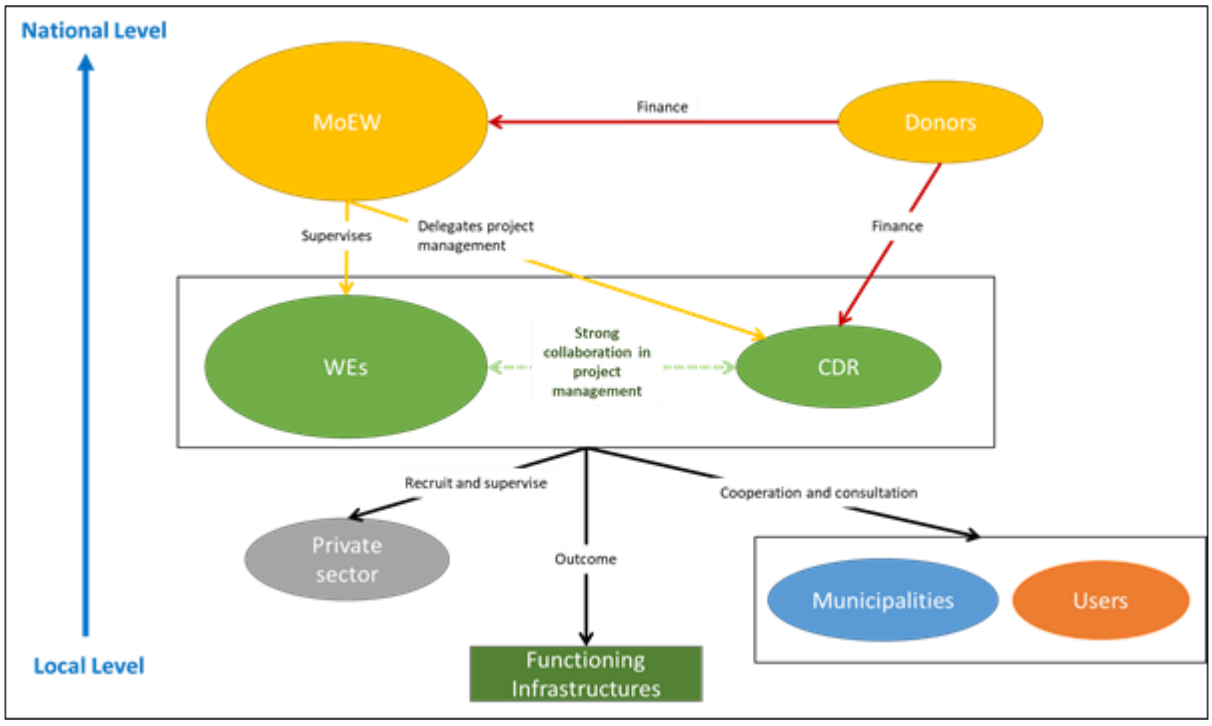

Figure C 40 WE involvement according to Law 221 and the NWSS

Under this arrangement, the donors finance the CDR and the Ministry, with the Ministry then providing guidance to both the WEs and the CDR.

The WEs and CDR should be responsible for ensuring the infrastructure functions correctly by monitoring the private sector and by working with municipalities and communicating with users.

In reality, the infrastructure project implementation framework is closer to the diagram below:

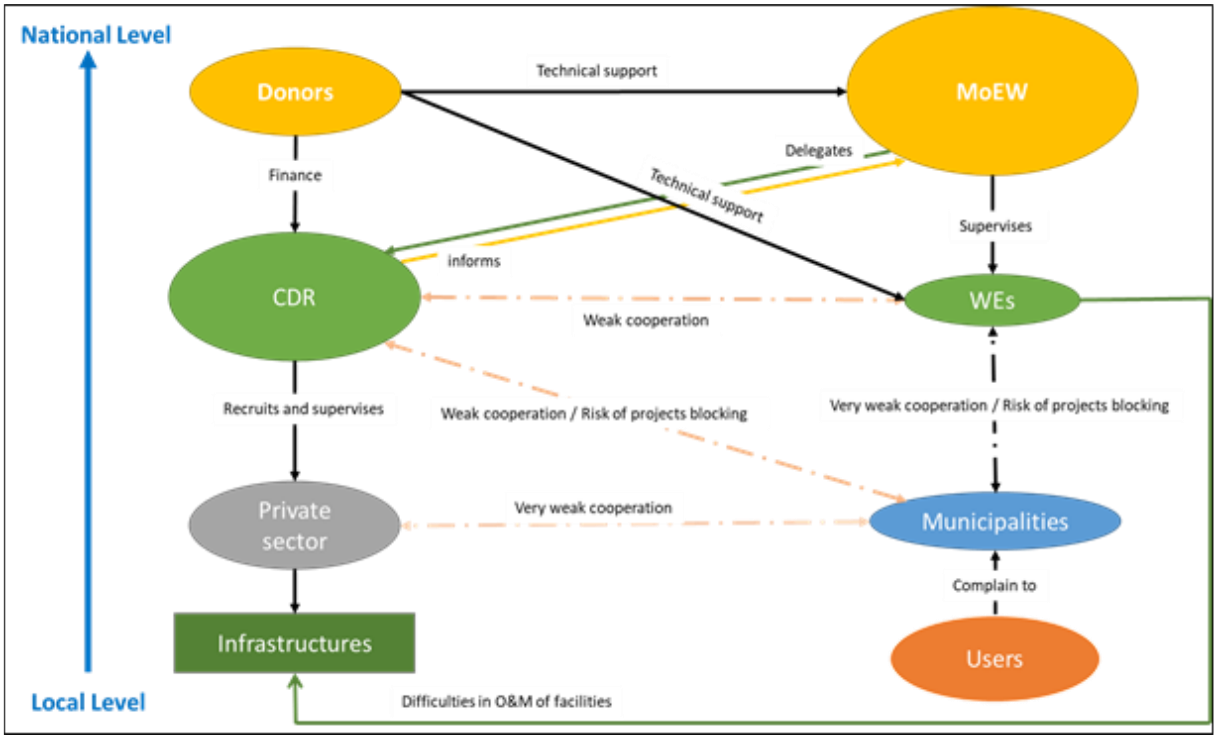

Figure C 41 WE involvement according to current practice

The donors provide technical assistance to the WEs and the Ministry of Energy and Water, which delegates the monitoring of works to the CDR that has a very large sphere of influence. WEs have very little influence and there is poor cooperation between the WEs and the CDR.

Municipalities also appear to have an influence over project implementation, mostly because they are the main point of contact for users and are able to block projects, should they wish to do so. There is poor cooperation between the WEs and municipalities, and between the municipalities and the CDR. There is also poor communication between the WEs and the users (as described in previous chapters).

C.4.2 MAIN FINDINGS AND RECOMMENDATIONS

This gap in project management is mainly due to the underlying approach of infrastructure projects. This complex situation has arisen as a result of the investment planning and implementation approach developed, which focuses on infrastructure and not on access to services for the population or users. The main objective of the projects implemented through the CDR is to build facilities, which is one of the core missions of the CDR. Nevertheless, this objective is not or rarely combined with the ultimate purpose of these facilities which is to provide sustainable services to users.

In addition to the project implementation framework, this approach has the following impacts in terms of service management and investment sustainability:

- There is a fragmentation of management roles between the CDR project manager and the WEs, who are manage services but have little involvement in project management;

- The service's contracting authority (the WEs) is absent during the construction phase, but should be the first point of contact for users in the field; as a result, there are many situations where local residents or municipalities block the work from going ahead;
- There is no anticipation of the facilities' operating and maintenance costs in the design and construction phases since the project manager's role is just to manage the project and not to set up a service;
- There is little consideration paid to the technical and financial capacities of the service operator when designing the facilities;
- The WEs lack the technical and financial capacities to ensure the operation of the facilities built (especially for the wastewater management facilities as, technically, the WEs have no internal staff and no proper contracting framework to supervise private operators and, financially, there is no proper tariff structure for wastewater management);
- There is increased conflict between stakeholders;
- There is no access to a sustainable service for users.

When developing projects, it is therefore crucial to include a service-oriented approach to ensure sustainable access to the service. Such an approach would ideally place the operators (i.e. WEs) at the heart of the processes and position each stakeholder within their legitimate framework for action, which would improve coordination between MoEW/CDR/WEs and with users.

SECTION D
Water tariff analysis

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PREAMBLE

Data collected from the WEs is subject to uncertainty, the margin of which varies from one WE to the other.

This mainly refers to:

- The number of connections/customers
- The number of gauges/water meters
- The number of water meters read and unread
- Water volumes (produced, entering into the system, supplied to the consumers and billed)
- The estimated number of illegal connections
- The estimated % of UFW)
- The estimated Commercial v/s physical losses
- The exact water balance by sector.

Therefore, all figures shown in the report are to be taken as Consultant's best estimates.

The causes for such uncertainty results from a combination of factors such as:

- The gauge system is misleading with no possibility to monitor the volume actually supplied at the customer level and conduct to waste of water. Moreover, the gauge system is technically and economically counterproductive.
- Absence of meters or meters unread.
- Gap between official number of subscribers and consumers actually supplied. This requires conducting systematic customer surveys.
- Difficulties to reconcile technical data and financial information as captured by the accounting department in the books.
- Difficulty/impossibility to introduce and monitor Key Performance Indicators (KPI) which are a must in modern water utilities.

Concerning financial statements, and in the absence of compliance with IFR Standards, most of the information collected is subject to clarification. Reasons for that are:

- Outstanding debts (social security, energy and municipal taxes) are either unknown or not properly entered into the books and, thus, distorting the actual cost of the service. On top of that, some of these debts are to be considered as bad debts.
- The same applies to account receivables.
- The customer management system is not secured (interface with accounting).

Introducing International Financial Reporting Standards (IFRS) standards along with the appointment of qualified chartered accountants and auditors will progressively build up confidence in the financial statements. This exercise is to be combined with a “tabula rasa” procedure for having undisputable *Opening Balances*[1].

[1] A financial document describing the assets and liabilities of an organization; provided that the assets are resources owned by the business.

D.1 OVERVIEW OF THE PRESENT SITUATION OF THE WATER ESTABLISHMENTS

Table D 1 gives an overview of the present (2018) situation of the WEs.

Table D 1 Overview of the WEs

	NLWE	BWE	BMLWE	SLWE
Est. population of the service area	1 716 000	750 000	2 907 000	1 200 000
Nbr of villages	457	250	533	385
Nbr of subscribers/customers (2018)	124 793	86 761	592 835	176000
Nbr of actual employees	637	403	782	236
Nbr of autonomous sub-systems	8	11	6	7
Est. length of the networks (km)	1 839	4 384	9 000	5 000
Est. unaccounted for water (%) (1)	46 %	48 %	30 - 40 %	55 %
Nbr of water meters	56 266	38 400	185 960	N/A
Volume produced (Million m^3/Y)	106	68	171	113
Est. collection rate	63 %	32 %	79 %	51 %
Nbr of WWTP under the WEs jurisdiction(2)	29	13	20	27
Est. households connected to the sewer				

Note: (1) Unaccounted for water % as per verbal communication from the WEs.
(2) This is the total number of WWTP in service or currently under construction, that are located under the jurisdiction of the WE, and operated either directly by the WE, or by CDR or others.

D.1.1 OFFICIAL AND ILLEGAL CONNECTIONS

There is an obvious gap between the total population of the served areas and the population officially supplied (as deducted from the official number of subscriptions). The cause for that entails the private wells and the high number of illegal/unknown connections tapping from the network with no benefit for the WE. The amount of "tap water from unknown origins" ranges between 8% and 55% whenever compared with the estimated population in the service area.

Table D 2 Total population v/s supplied population

	NLWE	BWE	BMLWE	SLWE
Est. population of the service area	1 716 000	750 000	2 907 000	1 200 000
Official nbr of subscribers/customers (2018)	124 793	86 761	592 835	176 000
Est. population supplied	561 569	390 425	2 667 758	792 000
Est. population tapping the water from unknown origin	1 154 432 (67 %)	359 576 (48 %)	239 243 (8 %)	408 000 (34 %)

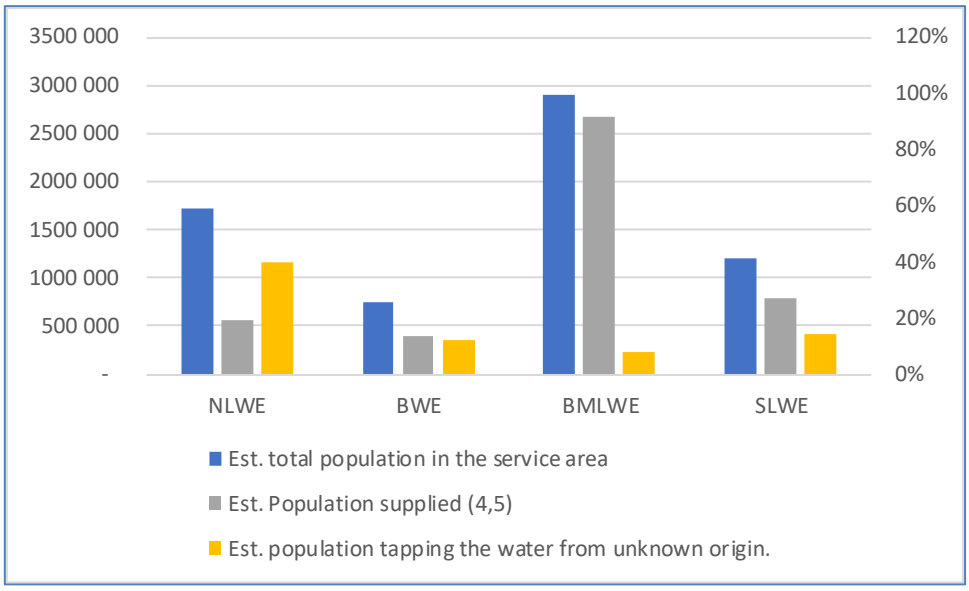


Figure D 1 Population supplied v/s overall population

While in BMLWE, the situation is at a satisfactory level with limited population tapping water from unknown origin, the situation is more alarming in the other WEs with the estimated population supplied from unknown origin is at the same level or higher than the population officially supplied.

The term "illegal connection" does not necessarily mean fraud, as it could be incorrect attributes in the customer database or unidentified customers, who in good faith, are receiving piped water.

Consequently, the top priority is not to change the tariff level, but to increase the number of customers in the customer databases. Transforming these illegal connections into legal one would certainly participate in the reduction of the UFW rate (commercial losses) and significantly increase the revenues of the WE with no additional cost.

At this stage, the top recommendation is to carry out a systematic customer census in some areas in order to achieve the following:

- Addressing the accuracy of the data regarding the existing legal connections (customer number and coordinates, good condition of the gauge and the water meter… etc.).
- Detecting/tracking the illegal connections and transforming them into legal.
- Collecting the arrears (unsettled bills) and possibly the accrued penalties.
- Geotagging the connections with the GIS network, if feasible.

A combined customer census with EDL and the 4 WEs would certainly be of a substantial benefit for the two organizations while sharing the cost. The rationale being that electric connection is easy to spot and there is a big chance for discovering a water connection as well. Then, the idea would be to discriminate obvious fraud from anomalies and wrong allocation in the respective databases for both EDL and WEs. Detection of

anomalies and sorting out these illegal/uncommon situations should be part of the scope of services assigned to the operator in charge of the census.

D.1.2 ADDRESSING THE ISSUE OF PRIVATE SOURCES

This refers to private wells or springs entering into the public domain and supplying a specific number of customers. This is commonly encountered with private wells built in the basement of buildings. Water is tapped and cost refers only to the operation and maintenance of the pumps and associated apparatus.

Such “private utility” is widely spread and could be a matter of concern with possible over-extraction in the aquifer or discharging effluent in the environment (Industrials).

Regaining control is the task of the MoEW in collaboration with the WEs, whose responsibility includes “to control the surface and underground water quality and identify standards to be applied” pursuant to Law 221.

A possible option for locating these “private sources” is to include this as part of the customer census. In the future, a fee could be established as “a possible abstraction fee”.

D.1.3 SLUM NEIGHBOURHOODS

Data concerning the number of slum neighborhoods in Lebanon, their location, the number of inhabitants and else, is not available to date.

Most of the potential water subscribers in slum neighborhoods do not have the legal documents required for water subscription - such as attestations from the municipality, proof of completed construction works, lease contract, copy of electricity subscription receipt…etc.

Therefore, they have access to water either through establishing illegal connections when a nearby network is available, or through water tankers at a very high price. The WEs are not interested to invest in the construction of a distribution network in such neighborhoods because they get no financial return.

Until the day when the "illegal settlers" inside the slum obtain legal statuses and therefore may legally subscribe for water, a way out would be to have the municipality set out – in coordination and with the agreement of the WE - a closed DMA the boundary limits of which encloses the whole slum and is agreed upon with the WE. The municipality would then subscribe to the WE for the supply of the DMA through a single metered entry point and would pay for the volumes of water received.

Within this DMA, the municipality would act as a local service-provider for:

- The construction of the distribution networks
- Household connection/disconnection to networks
- Billing and collection
- Operation and Maintenance
- Water safety plan
- Customer care and complaints management

However, the legal side of such arrangements must be carefully looked at and coordinated with the MoEW, as it does conflict with the WEs monopoly over the distribution of drinking water. It would be necessary to issue bylaws giving the WEs the possibility to proceed with such arrangements if they wish to.

D.2 TARIFF LEVELS AND STRUCTURE

In the absence of a national water tariff strategy in Lebanon, each WE has developed its own adjustment tariff according to their specific costs and political and social constraints, and tariff levels and structures are harmonized within each WEs. Such a challenge was not easy to achieve especially in the NLWE. In this particular area, each former water office had its own tariff level and structure. Streamlining and harmonizing the various grid has taken some time.

Meanwhile, the tariff levels are very different from one WE to the other, as shown hereunder. The rationale being that operating conditions might be different (gravity v.s pumping, treatment plant v.s spring water, length of the network in rural area v.s urban). Social and economic conditions were also taken into account for defining the various tariff grids.

Table D 3 Annual water tariff for a 1 m³/day subscription

	NLWE		BWE		BMLWE		SLWE	
in LBP	Gauge	Meter	Gauge	Meter	Gauge	Meter	Gauge	Meter
Tariff for 1 m³/D	228 000	228 000	180 000	NA	230 000	275 940	216 000	216 000
Maintenance fee	12 000	24 000	20 000	NA	40 000	120 000	25 000	35 000
TOTAL	**240 000**	**252 000**	**200 000**		**270 000**	**395 940**	**241 000**	**251 000**

For BWE, although more than 40 000 water meters were installed, the billing is made on a flat basis. Moreover, it seems that most of the water meters are not under the control of the WE, but under the jurisdiction of local communities.

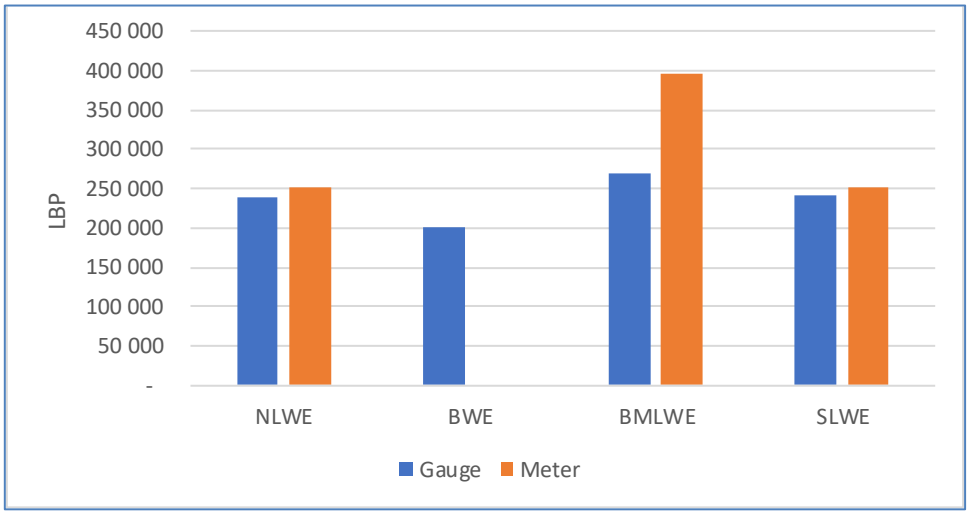


Figure D 2 Gauge v/v meter annual water tariff for 1m3/day subscription

For water meter subscription, the methodology and frequency for billing differ from one WE to the other. While BMLWE is billing on a 6 months basis, NLWE is experimenting a quarterly billing frequency.

While BMLWE is charging 756 LBP / m³ starting from the first m³ delivered, the NLWE combines a flat rate and a tariff excess: The rationale is based on a fixed full billing of the daily-subscribed volume for the whole year plus relevant fixed fees (maintenance and wastewater). The additional consumed volume is billed every three months (quarterly billing) at the rate of 600 LBP/m³ for residential and 1200 LBP/m³ for industrial and tourist facilities. For example:

	Q2
Standard consumption for 2m³ (90 days x 2 m³)	180
Meter index in m³ as read	190
Excess in m³ (L2 – L1)	10
Consumer is charged 10 x 600 LBP	6 000

It is to be noted that the "cross subsidy concept" has not yet been introduced. This concept is based on block tariffs linked to consumption (i.e., the rate for the first block tariff is the social rate provided at a fairly low price, and the next block tariffs are priced higher as the consumption increases).

As a quick observation, the water tariff grids are somehow unclear and difficult to read for an outsider, with many cases depending on diameters, gauges, meters, and sometimes on the area of the dwelling. Such a feature is applicable in BWE where the amount subscribed for a new customer is apportioned to the size of the house. A simplified explanation should be provided to the public, most effectively in a leaflet, as part of the service agreement between the customer and the WE.

It is also highly recommended to separate the water and sewage fees from the connection fees. The latter should be explained in a detailed manner to the potential customer. From documents received, the connections fees were mentioned as a regular fee although this is paid only once.

D.2.1 CUSTOMERS' CATEGORIZATION

There is a great advantage in categorizing the customers and setting a particular rate for each category. Such approach participates to the cross-subsidy concept whereby larger consumers are charged at a higher rate compared to smaller, domestic households.

For instance, NLWE has already developed this approach by charging residential and commercial categories a rate different from that of industries and touristic facilities.

D.2.2 GAUGES V/S METERS

Water metering is relatively new in Lebanon where tradition is based on non-metered subscribers (the gauge). Main criticism to the gauge system refers to the following:

- Inaccuracy of the volume of water actually delivered at the customer level

- The system does not motivate water saving at the consumer level since price is the same regardless the actual consumption.
- For the WE, the non-metered delivery system is counterproductive since it hinders monitoring and control of the unaccounted-for water (UFW). On top of that, all efforts made by the WEs to reduce technical losses will not generate financial benefit for the organization. In other words, leakage detection and repair will increase the water available to the final users but with no additional revenue for the WE. Contrarily, all additional m^3 made available and metered at the consumer level is charged respectively at 750 LBP in BMLWE and 600 LBP in NLWE. This additional revenue is to be considered as a marginal income towards the cost of leaks detection and repair. Thus, this will benefit the WE.

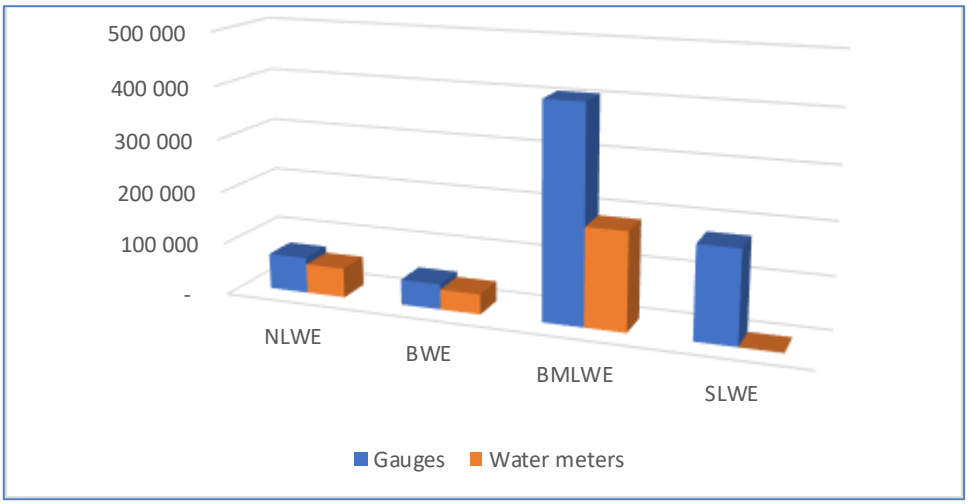


Figure D 3 Gauge v/v meters

The WEs introduced water meters with mixed results: While it is a success in BMLWE, the majority of the meters in BWE are not regularly checked and, therefore, billed on a flat basis. In the BWE, only 3000 water meters are checked for monitoring purposes. In the NLWE, the result is somehow mitigated with household water meters not read and only big consumers receiving the metered bill. In SLWE, the situation is unclear with no reliable data regarding the number of meters installed and the reading/billing mode.

Table D 4 Water meters status in the WEs

	Number of water meters	% of the subscribers	Comments
NLWE	56 266	45%	Individual meters are not read and billed on a flat basis. Seems that only big consumers water meters are actually read.
BWE	38 400	44%	Approximately 38 000 meters have been installed, but billing is made on a flat rate. Only 3000 meters are read for monitoring purpose.
BMLWE	185 960	31%	Metering is a success and even smart meters have been installed. Management is willing to increase the number of meters.
SLWE	NA	NA	Seems that metering is not comonly encontered.

D.2.3 THE METHODOLOGY FOR METERING AND BILLING

As previously mentioned, only BMLWE and NLWE are using meters for billing purpose. At this stage it has been pointed out that the methodologies are totally different and while NLWE is charging only the excess of tariff, BMLWE is charging regardless of the volume subscribed. While BMLWE is charging annually a fixed fee that is deemed to cover the water maintenance only on an annual basis, NLWE fixed fees are deemed to pay for the cost of the water as a flat fee.

Table D 5 shows a comparison between the two methods, based on a nominal consumption of 483 m³/year, which represents 365 m³ (annual consumption of 1 m³/day subscription) + 20 %

Table D 5 BMLWE v/s NLWE metering/billing based on yearly consumption

	BMLWE	NLWE
Yearly consumption (365 m³ increased by 20 %)	438 m³	438 m³
Unit price for 1 m³ metered (LBP)	756	600
Fixed fee (water only)	60 000	240 000
Excess of consumption		73 m³
TOTAL (LBP)	391 128	283 800
Average tariff (LBP/m³)	893	648

This partially explains the good financial performance of BMLWE. However, in order to conduct a fair comparison of the two methodologies, an average price/m³ is used in both cases. Results are self-explanatory, as shown in Table D 6.

Table D 6 Comparison for metering and billing BMLWE NLWE

	BMLWE	NLWE
Average price per m³ metered	678 LBP	678 LBP
Volume actually consumed yearly	438 m³	438 m³
Fixed fee (water only)	60 000	240 000
Excess of consumption		73 m³
TOTAL	356 964 LBP	289 494 LBP
Average tariff / m³	815 LBP/m³	661 LBP/m³

Basically, with the same average price by m³, BMLWE method leads to an average tariff 23% higher than in NLWE. For the sake of being fair, it is reminded that NLWE's price varies from residential (600 LBP/m³) to touristic (1200 LBP/m³).

Regardless of this feature, which is of a minimum impact, the following graph illustrates the comparison of metered water billing.

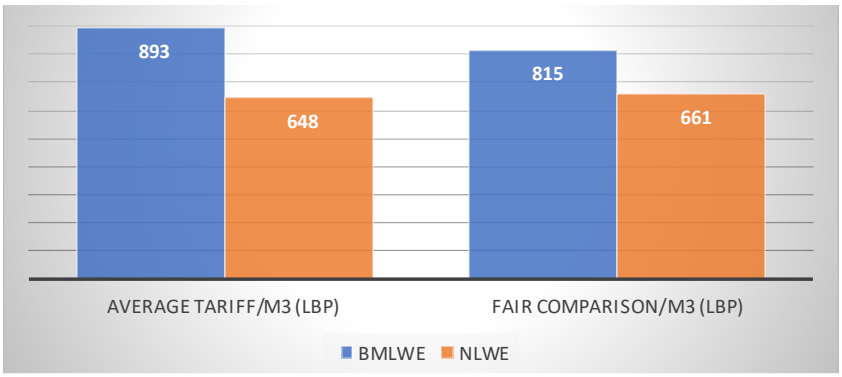


Figure D 4 Metered water billing comparison

Meanwhile, and bearing in mind that SLWE and BWE have not yet started to charge the customers on a metered-water basis, a decision is to be made on a national level to address this particular issue of the methodology for metering and billing.

Our recommendation is to follow the practice used in BMLWE and propose a reasonable low-fixed fee (the water-meter maintenance fee) and a variable fee apportioned to the exact volume actually consumed.

On the long run, this will have strong implications especially if, in the future, sewage is to be charged as apportioned to the volume of water consumed.

D.2.4 THE SEWAGE FEE

Concerning sewage, the good news is that customers have to pay a fee regardless of the service being rendered or not. The idea behind it is that houses that are not connected to the sewer have to pay a “pollution tax” for damaging the environment.

Table D 7 Yearly sewage fee

	Connected to the Waste Water system	
	Yes	No
NLWE	20 000	10 000
BWE	60 000	15 000
BMLWE	40 000	25 000
SLWE	30 000	15 000

Such feature has to be maintained and elaborated in the coming years. On the long run, such pollution tax should be apportioned to the individual sewage system with a low tax when a septic tank is there and a higher rate when such feature does not exit.

In the future, and bearing in mind a generalization of the metering, it is recommended that the sewage fee be proportional to the actual consumption.

D.3 COLLECTION RATES

Although the method for figuring out the collection rate is variable from one WE to the other, the collection rates differ with BMLWE collecting 80% of the bills while the others are collecting between 50 to 32% of the amounts receivable as shown hereunder.

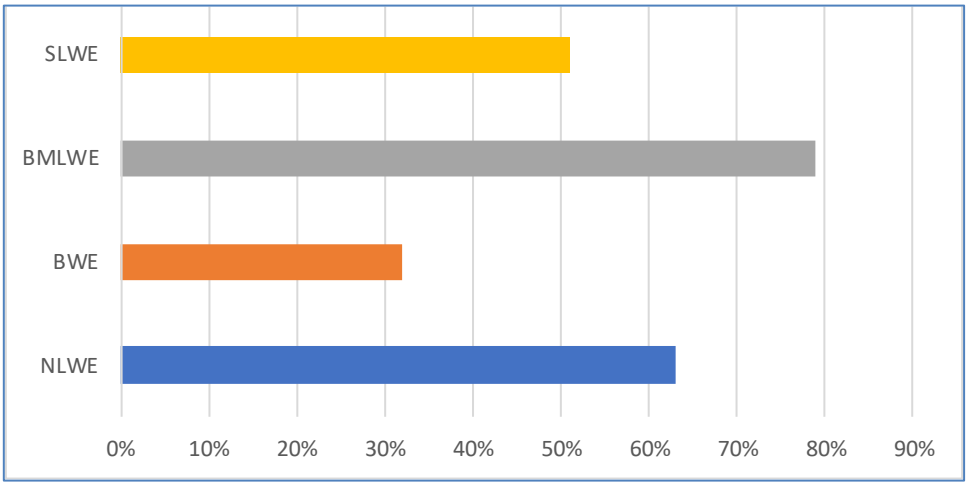


Figure D 5 Estimated collection rate

In BWE, the picture is slightly different with a collection rate reaching 47% and 55% in Zahlé and Machgara respectively, while only 16% in Rachaya.

Addressing the collection rate is always a critical issue and a vicious circle, whereby poor performance of the water enterprise is leading to a non-settlement of the bills and the non-revenues are leading to the poor performances.

Increasing the collection rate is a combination of :

- Public awareness campaigns
- Pro-active customers recovery campaigns including a discount for the arrears in exchange of a down payment or settling by instalments.
- Customer census.

In addition, the timing of such a campaign must coincide with a real breakthrough in the performance of the service. In other words, such actions can be organized in zones supplied on a continuous basis and with a quality complying with the standards.

D.4 COST OF THE WATER AND FINANCIAL SITUATION OF THE WES.

Cost of the water and wastewater is somehow difficult to understand since financial statements concentrate on budget rather than on cost control as derived from financial statements prepared in accordance with IFRS.

However, with the exception of BMLWE which benefits from higher subscription rates, the highest tariff level and a good collection, the other WEs are not matching the operating cost (personnel, energy, administrative expenses and maintenance). Moreover, the WEs are accumulating debt vis-à-vis EDL, Municipalities and the NSSF. As a result, those WEs are gradually running short of cash, with the exception of BMLWE.

As an illustration, the following tabular presentation and the associated graph describe the revenues and expenditures of SLWE (2015 – 2017) with revenues[2] remaining stable year after year while expenditures are increasing during the same period. Moreover, no payment whatsoever has been made to cover energy expenses (EDL) nor amortization.

Table D 8 Simplified statement of revenues and expenditures in SLWE

Item	2015		2016		Change %	2017	
REVENUES							
Subscription Revenues	35 899 483 000	81.42%	36 507 241 000	79.44%	1.69%	35 760 312 000	79.23%
Maintenance Revenues	4 398 881 000	9.98%	4 439 792 000	9.66%	0.93%	4 589 852 930	10.17%
Waste Water Revenues	2 684 685 000	6.09%	3 737 185 000	8.13%	39.20%	3 472 922 500	7.69%
Other water revenues	904 471 688	2.05%	1 010 929 980	2.20%	11.77%	1 171 140 920	2.59%
Other Revenues	201 826 270	0.46%	259 936 396	0.57%	28.79%	140 789 975	0.31%
Total REVENUES	**44 089 346 958**	**100.00%**	**45 955 084 376**	**100.00%**	**4.23%**	**45 135 018 325**	**100.00%**
EXPENSES							
Salaries, Wages and related expenses	8 494 938 950	19.06%	9 501 405 431	18.10%	11.85%	10 975 312 706	21.14%
Energy Expenses							0.00%
Maintenance Expenses	22 556 258 477	50.60%	27 742 145 066	52.83%	22.99%	25 167 346 402	48.47%
Other Admin Expenses	12 726 849 295	28.55%	14 285 911 627	27.21%	12.25%	14 918 246 481	28.73%
Misc	801 814 310	1.80%	978 326 976	1.86%	22.01%	863 838 247	1.66%
Total EXPENSES	**44 579 861 032**	**100.00%**	**52 507 789 100**	**100.00%**	**17.78%**	**51 924 743 836**	**100.00%**
Net Profit and Loss	**-490 514 074**	**-1.11%**	**-6 552 704 724**	**-14.26%**	**1235.89%**	**-6 789 725 511**	**-15.04%**

[2] From discussion with the various stakeholders, it is not clear if revenues refer to accrued revenues or cash revenues.

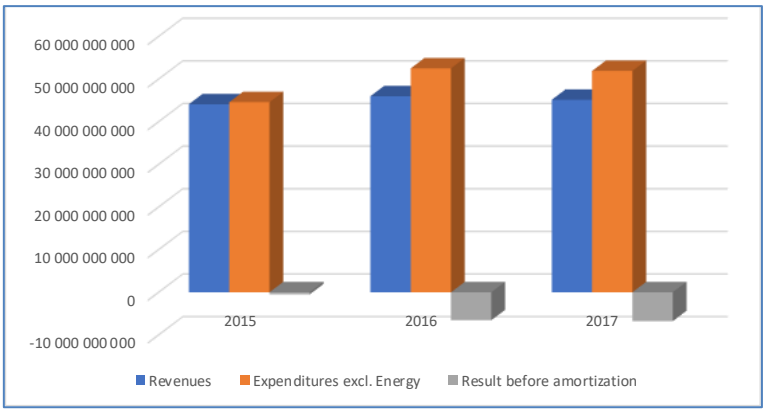


Figure D 6 Simplified statement of revenues and expenditures in LBP in SLWE

Over time, the situation is deteriorating with accumulated losses increasing. On the long run the situation will not be sustainable.

A combination of **increasing revenues through a customer census** and an enhanced **campaign for bills and arrears collection,** as described above, would **probably increase the revenues of SLWE significantly**. In this case and with the same tariff level, the WE could pay for the operating cost, including the energy. It is difficult to assess what would be the impact of the metering (see Section D.2.2), but referring to BMLWE's case, it would certainly boost the revenues of the WEs.

D.5 SUBSCRIBERS V/S CUSTOMERS: THE ORGANIZATIONAL APPROACH

Concerning the Customer management, in most of the WEs, the commercial issues such as the connection cycle, the billing/collecting cycle as well as the complaints treatment all fall under the responsibility of the financial department. With exception of the SLWE that has a customer affairs department identified in the organizational chart, other WEs do not have a similar department.

Table D 9 The position of customer management in the WEs

BMLWE	BWE	NLWE	SLWE
Financial affairs Dept.	Finance Dept. Financial accounting unit	Financial affairs	Customers affairs & accounting for collection

The reasons behind this are:

- The Customer management concept is not part of the culture within the WEs and most of the WEs refer to “subscribers” and not “customers”.
- For historical/legal reasons, the billing and the collection are separated and are considered as part of the finance scope of services. This comes from the traditional heritage although the IT systems nowadays are facilitating the reconciliation between payments and invoices.
- In some WEs, customer management has been introduced including complaints being monitored through a call center. The same applies to the introduction of modern payments through banks or other organizations.

Thus, there is a need to separate the Customer Management (CM) from the finance management and to boost the tasks assigned to the former. This includes not only the billing/collecting but also the connection/disconnection cycle, the issuance of services orders, the monitoring of the water meters’ life cycle, the customers’ complaints processing, and the marketing of the services rendered by the WEs. The whole picture should be perceived as a build-up process where the WEs progressively regain confidence of the customers in the public utility performances.

Moreover, if the tendency is to introduce water meters on a large scale, the billing exercise will become more complex with the water meter readers’ management (round of water meters’ readers), the treatment of anomalies even with smart meters and the frequency of the billing which can be made on a quarterly or bi-annual basis.

The whole exercise will require additional engineering input and WEs should not underestimate the challenge. As an illustration, many water meters are actually never checked and are billed on a flat rate basis (BWE, SLWE…). The reason is somehow unclear and can vary between IT system’s unavailability, unpreparedness of the personnel, understaffing, unreliability or non-functioning/disruption of the meters… etc.)

This reflects the reluctance of the WEs vis-à-vis the water metering.

D.6 THE STAFFING OF THE WEs

In general, the WEs:

- Are understaffed
- Their personnel is underqualified
- The personnel is underpaid

D.6.1 THE STAFF PRODUCTIVITY INDEX

The *Staff Productivity Index* is the standard ratio: Number of WE staff members/number of customers.

This index shows how under or over staffed the WEs are. Acceptable ratios range from 2 to 5 staff members per 1000 customers.

Table D 10 below shows how short the various WEs fall to meet the standard.

Table D 10 Staff Productivity Index of the WEs

	NLWE	BWE	BMLWE	SLWE
Number of connections	124 793	86 761	592 835	176 000
Acceptable staff number according to the *Staff Productivity Index* (Min 3/1000 - max 5/1000)	374 - 624	260 - 434	1 779 - 2964	528 - 880
Actual staff number	**637**	**403**	**782**	**236**

Comments on the above table are:

- BMLWE is really understaffed. For this reason, the private operators are being extensively referred to for the provision of the operation and maintenance of the pumping stations.
- SLWE is also understaffed.
- The situation is less alarming for NLWE and BWE, but this is to be combined with the big number of unknown customers tapping the water from the network. (see above). In other words, on the day these unknown customers are officially registered, the staff number will have to be adjusted.

The main reason behind the understaffing is the level of wages that is low compared with those of the private sector, as salaries must comply with the official grid established by Ministry of Finance. As a result, there is a tendency to outsource part of the business to the private sector.

Besides, all commercial departments are understaffed. On the other hand, the gauging system is easy to manage (no regular meters' reading) and billing is done once a year.

A review of the staffing policy and wages is highly recommended at this stage.

D.6.2 THE OUTSOURCING TO PRIVATE OPERATORS

The outsourcing to private operators varies from one WE to the other. Such an option can be regarded as a cost-efficient favorable option provided that:

- An open bidding procedure is organized
- The scope of the services is thoroughly defined
- Reporting and control are included as part of the scope of services.

On that particular issue, hiring the services of a consultant for designing the scope of services and selecting the most suitable private operator is highly recommended.

D.7 BOOK KEEPING AND FINANCIAL REPORTING

The following tabular presentation is a quick description of the financial reporting of the WEs.

Table D 11 Transmitted financial documents

	NLWE	BWE	BMLWE	SLWE
Balance sheet	No	Yes	Reportedly yes	Yes
Inventory of assets	No	unclear		Yes, but uncertain
Statement of revenues and expenditures	Yes (operating cost only)	Yes	Reportedly yes	Yes, but incomplete since energy is not accounted for
Amortization	No	No	?	No
Comments				Only 2017 financial statements have been closed

WEs are trying to comply with modern financial reporting standards but rely on their own resources for that.

All efforts in that respect must be encouraged and supporting them will necessarily need a strong input (see recommendation, hereunder).

D.7.1 THE BOOKKEEPING

Bookkeeping is somehow cumbersome with two systems maintained in parallel: One refers to the administrative budget that is a requirement of the tutelage (MoEW); and the other refers to the double entry system following a chart account. As far as the second one is concerned, WEs reported that such an account refers to the International Financial Reporting Standards (IFRS).

D.7.2 THE EARMARKING OF THE ASSETS, THE INVENTORY AND THE PROPERTY OF THE FIXED ASSETS

One of the main obstacles on the accounting side refers to the absence of an opening balance.

This mainly concerns the inventory of the fixed assets which is incomplete since some of them have been sponsored by external donors (NGO and/or international organization), or by the Government of Lebanon through the Ministry or the CDR. The drawback is that, upon official transfer to the WEs, no accounting documents and official hand over were produced for a proper entry into the books.

As a result, fixed assets are underestimated in the books. For instance, in SLWE, the fixed assets are worth USD 4.3 million, which is somehow unrealistic.

As a result, the amortization either is underestimated or does not exist at all. This hinders the process of defining the true cost of the services and the water supplied.

Updating the fixed assets inventory will require historical research as well as expertise on the condition of the assets, bearing in mind that all the transportation/distribution networks are underground.

Such inventory is a prerequisite for targeting a full-cost tariff level recovery.

D.7.3 THE AUDITING OF THE WES

Major recommendations refer to the appointment of an independent auditor who would assist the WEs in establishing an official opening balance and getting the approval of accounts for the three financial years.

Appointment of an independent auditor is specifically mentioned in Article 4.2 of Law 221. Pursuant to this provision, each of the WEs is supposed to appoint the independent auditor and payment is to be made from the WEs' budget. For unclear reasons none of the WEs has used this opportunity.

At this stage, our recommendation is to appoint one unique independent auditing firm for the four Wes, financed by the MoEW, under the Ministry's budget for:

- Establishing/certifying the official opening balance(s)
- Approving the accounts for the three upcoming financial years
- Certifying the regularity and fairness of the accounts
- Reporting to the various stakeholders (W() and concerned Ministries)

The appointment of a unique auditor and consulting firm will ensure the streamlining and standardization of procedures and methodologies among the four WEs. This will ensure fair comparison and benchmarks of the performances of the WEs. Such task falls under the responsibility of the MoEW.

The appointment should cover at least three years to ensure significant progress.

At this stage, auditing by the Cour des Comptes is somehow questionable since it will be a duplication of the work with no real perceivable benefit. Moreover, the report produced by the state auditor was delivered late after the closing of the accounts, with no tangible use. However, this matter is of a legal nature and has to be sorted out.

D.8 OTHER REPORTS TO BE PRODUCED BY WES

According to our records, only BWE has produced an annual report with valuable substance in it. And this is a real achievement which is worth mentioning.

Meanwhile, there is a need to produce an annual report, addressing several items as described hereunder.

D.8.1 ANNUAL REPORT

Annual report encompassing the following items:

- Volume of water produced for each subsystem
- The situation of the network (age, length, materials and diameters)
- The status of each reservoi
- Actual volume entering into the systems and subsystems
- Billed volume
- Collection rate for the whole WE and for each sub-sector
- UFW
- Quality of the produced and supplied water
- Number of customers and their categorization
- The water meters' age, brand and status
- The wastewater situation
- Simplified financial situation
- Ongoing projects
- Planned projects

In that respect, a standard template report designed for the WEs would be essential for a fair monitoring of the situation of the WEs. Hiring a consultant for a technical assistance for that particular purposes should be considered.

D.8.2 PARTICULAR REPORT ON UFW

Particular attention should be paid to the UFW (or the non-revenue water; NRW) which is a critical issue in the WEs. A UFW specialist must address such a feature and hiring a specialized consultant should be considered as a viable option. The scope of services would include, inter alia:

- Measurement of and methodology for the monitoring of the NRW.
- Designing plans for district metering
- Designing and initiating plans for reducing the amount of UFW

Another option to be considered is to implement a performance-based contract to work on the reduction of the NRW. Such contracts with private operators were introduced in a pilot project within the BMLWE financed by the World Bank.

D.9 THE IT ISSUE

On the IT side, it seems that many opportunities have been lost while each WE was preoccupied in developing IT systems of their own for billing and collecting, accounting and other packages. For instance, the X7 customer management was implemented in the NLWE and the BWE[3], while the others are using other packages. At this stage, a unique, centralized, feasible and common package for the four Wes, under the authority of the MoEW, would have probably benefitted all the WEs at a lower cost. Moreover, such a common approach would facilitate the exchange of information and the standardization of procedures for the reporting to the MoEW.

A study is needed to assess the current situation and compare all the presently implemented IT systems for billing, collecting and accounting in order to identify the most convenient system to be implemented in all four WEs.

[3] For the BWE, X7 was implemented but the USAID has insisted on implementing its own package, making all efforts that were undertaken useless.

D.10 TUTELAGE VS. AUTONOMY

The WEs, pursuant to Law 221, are autonomous state-owned business organizations under the tutelage of the MoEW. They have their own board, organizational chart and management.

The autonomy concept is gearing to operate the business under the supervision and control of the board of directors, while the tutelage is gearing towards a tight control of the day to day management with budget approval and clearance of all major decisions, including appointment of the General Manager and approval of the water tariff level/structure.

The whole system is about checks and balances with some occurrences of clashes between tutelage and autonomy. The whole thing must be seen in the perspective that tutelage is strengthened if and when WEs' performance is weak, while autonomy becomes reality if the WEs are financially well off.

It seems that we are half way through, and the controversy between tutelage and autonomy is an institutional/political issue to be addressed in a pragmatic way through consultancy.

The idea is to hire the services of a consultancy firm to:

- Describe the current situation of the WEs and their relation to the line Ministry.
- List the possible options available for consideration
- Address the pros and cons of the various options
- Propose institutional/legal recommendations and draft the various pieces of legislation required.

Such consultancy services would require:

- A team leader with strong institutional background, for a three-month assignment
- A local and legal expert for a one month and a half assignment.

The estimated budget would be around 1,000,000.00 USD.

D.11 THE SPECIFIC CASE OF IRRIGATION

Irrigation falls partly under the responsibility of the LRA established in 1954, whose mandate is to manage the Qaraoun Dam (190 Mw). The LRA's core business was to produce hydropower, which represents 2% to 8% of the energy delivered to EDL. Irrigation was added to LRA's mandate in 1974. In terms of turnover, irrigation constitutes approximately 9% of total revenues of the office and 30% of the staff's.

The WEs are in charge of irrigation in the areas not covered by the LRA.

Table D 12 The irrigation case

Stakeholders	Number of subscribers	Irrigated area
LRA	˜2 400	˜6 000 Hectares
NLWE	7435	3 400 Hectares
BWE	NA	NA

In NLWE, a lump sum amount of 20 000 LBP is set, without justification

D.11.1 THE RAW WATER TARIFF AND STRUCTURE

Unfortunately, the raw water for irrigation is not metered and, in LRA, the rationale is based on a flat rate for 1000 m^2, regardless of the volume that is actually being used. The rate is twofold, depending on whether the water was delivered by gravity (Kasmillé) or if it is pressured piped water type (Bekaa).

Table D 13 Irrigation tariff at LRA

Gravity	Pressure
110 000 LBP/1000 m^2	90 000 LBP/1000 m^2

Surprisingly, piped water under pressure is less expensive than gravity delivered water.

Although collection ratio is high (95%), the tariff level does not cover the implied cost and LRA is in a situation where energy is paying for the water.

In BWE (Yammoune area), the raw water tariff combines a subscription fee and an allocation of 60m^3/hour. The rate depends on the season:

Table D 14 Irrigation tariff at LRA

	Winter	Spring	Fixed fee
60 m^3 /hour	60 000 LBP	7 000 LBP	21 000 LBP

Reportedly, time allocation and amount of water actually supplied is questionable and therefore requires additional control.

As far as irrigation is concerned, major recommendations refer to the introduction of water-meter for irrigation and an in-depth investigation of the cost of the raw water.

D.12 SUMMARY OF MAIN RECOMMENDATIONS

Table D 15 Summary of main recommendations

Priority	Recommendation	Rationale	Expected output	Additional comments
High	Conduct customer census in the various WEs	High number of illegal/unknown customers	Increase number of customers and revenues with no additional operating costs	• Comprehensive customer census, possibly limited to some specific areas. • Possibly liaise with EDL for a joint census.
High	Appoint an external auditing firm for assisting the WEs in preparing the opening balance and approving the accounts for three fiscal years.	Existing book-keeping and procedures are not in line with the IFRS	On an annual basis, produce financial statements approved by independent auditors. • Balance sheet • Statement of revenues and expenditures • Cash flow and change in equity statements.	Auditing firm must assist WEs for: • Fixed assets inventory • Stocks control • Outstanding debts and account receivable • Approving the account and certifying their fairness and regularity for three years.

Table D 15 Summary of main recommendations

Priority	Recommendation	Rationale	Expected output	Additional comments
High	Consultancy services for identifying the reasons and bottlenecks for delays in water metering and billing, and for defining programs to overcome/mitigate the difficulties.	With exception of BMLWE, many WEs are billing the meters on a flat rate basis. Major causes refer to: • Cost of the meter's purchase/installation • Computer system is not adapted for meter billing • Staff is not trained or not available (Water meter readers) • Customer management procedures are not actually introduced and enforced • Psychological reluctance vis-à-vis meters • Fear that it will increase the cost • Legal obstacles • Technical obstacles especially in zones which are not supplied on a continuous basis.	A national methodology for addressing the water meter installation and billing process and a set of recommendations to each WE for tackling the water meter problem.	

Table D 15 Summary of main recommendations

Priority	Recommendation	Rationale	Expected output	Additional comments
Medium	Recruit an expert to monitor the UFW and introduce a methodology to progressively regain control over it	UFW not measured and not under control	• Good knowledge of UFW • Introducing district metering • Produce the annual report on the UFW	
Medium	Recruit an expert for designing a standard template for the annual report of the WEs.	Technical, financial and commercial reporting is not streamlined	A standard annual report common to all WEs which will allow a benchmarking of all WEs	
Medium to low	Introduce the customer management department as a new one within the organizational chart of the WEs.	For the time being, the billing/collection cycle is part of the finance department. The growing number of water-meters requires new methodology ranging from the management of the meter readers, to the connection-disconnection up to the complaints.		
Medium	Review the staffing policy of the WEs as well as the salary grids.	Salaries are not attractive for talented personnel.		

Table D 15 Summary of main recommendations

Priority	Recommendation	Rationale	Expected output	Additional comments
Medium	Review the tariff grid with the aim for simplification	Existing tariff grids are “difficult to read”.		
High	If the decision is made to outsource part of the business to private operators, the scope of services should be prepared by a consultant and open bid is highly recommended.	Outsourcing to private operators is seen as an abandonment for lack of expertise or lack of qualified personnel	Outsourcing must be seen as a mean to reduce the cost and, thus, will benefit the end user.	Scope of services to be defined by a consultant in collaboration with the WE.
High	Introduce metering of raw water for irrigation	Irrigation current consumption is a black box with risk of mismanagement of the resource.	A more cost-effective approach of the irrigation water use.	Such a feature is difficult to introduce in conservative rural areas.
Medium	Establish a listing of private wells and springs through a census.	Private water resources are widely used with environmental hazard ranging from over-pumping down to discharging effluent in the environment.	A better knowledge of the private utilities with the possibility to introduce abstraction fee in the future.	To be included as part of customer census.

D.13 BALANCE RECOVERY PLAN

D.13.1 USED METHODOLOGY

D.13.1.1 Introduction

The following section highlights possible scenarios for financial recovery of the WEs through a simplified financial simulation. The simulation addresses the major settings of a water public utility and displays the outcome over eight years. In other words, the financial model is a tool that answers the following question: What will happen if…?

For practical purposes, only one scenario will be proposed hereunder, leaving the possibilities for other scenarios carrying different criteria open.

The whole exercise is to ensure that the WEs' revenues are paying for the total operating cost, including energy and that the treasury situation is at a satisfactory level.

D.13.1.2 The baseline scenario: The case of 2018

Whereas key elements are:

- Statement of revenues and expenditures
- The collection rate of the year
- Volume produced
- Volume billed
- Average price/m³
- Operating cost /m³
- Collection rate

A typical baseline scenario would be as follows:

Table D 16 Typical baseline scenario

Baseline scenario 2018	
Nbr. of customers	100 000
Volume billed	40 000 000 m³
Average price/m³	800 LBP
Collection rate	50 %
Operating cost/m³	900 LBP

D.13.1.3 Main assumptions

The rationale is to make simulations through various scenarios and assess the financial outcome of each scenario. Major assumptions and variables are:

- Percentage increase in the number of subscribers, including the additional customers, as detected by a customer census.
- Percentage increase of the billed volume by reducing commercial and technical losses.
- Percentage increase of the average tariffs.
- Percentage increase of the collection fee.
- Percentage increase of the operating cost which should include energy, although today energy cost is not accounted for.

Table D 17 Typical baseline scenario

Scenarios	2019	2020	2021	2022	2023	2024	2025	2026
Subscribers increase rate	1%	30%	20%	10%	5%	4%	3%	3%
Volume billed increase rate	1%	20%	20%	10%	10%	5%	4%	4%
Average tariff increase rate	0%	30%	20%	10%	5%	5%	5%	5%
Collection rate increase rate	1%	5%	15%	10%	10%			
Operating cost increase rate	1%	2%	2%	1%	1%			

For instance, in the above scenario, the water tariff is to be increased on a three-year time lapse; respectively 30%, 20% and 10%. Such tariff escalation level and agenda is only illustrative and can be realigned and fine-tuned for taking into account the existing situation of the WE and local context. Meanwhile, the number of customers is to be increased in a significant manner by virtue of the customer census and operating cost should to remain under control. As far as collection rate is concerned, the proposed scenario considers that the collection rate starting from 50% will reach 74% by the end of the cycle.

The objective of the simulation is not to describe the real situation of the WEs, but to highlight the main parameters to consider for a sound recovery. Another option is to put top priority on the collection rate and moderate or delay the tariff increase. All options are on the table.

D.13.1.4 The outcome of the simulation

The financial model concentrates on the treasury situation of the WE, regardless of the other parameters such as the solvency, liquidity, leverage and profitability ratios. ayment of accounts receivable and settlement of accounts payable are not included in the model.

Meanwhile, a particular attention should be paid to:

- The price and cost of a m³
- The number of customers

The whole outcome is displayed under graph presentations, as shown below.

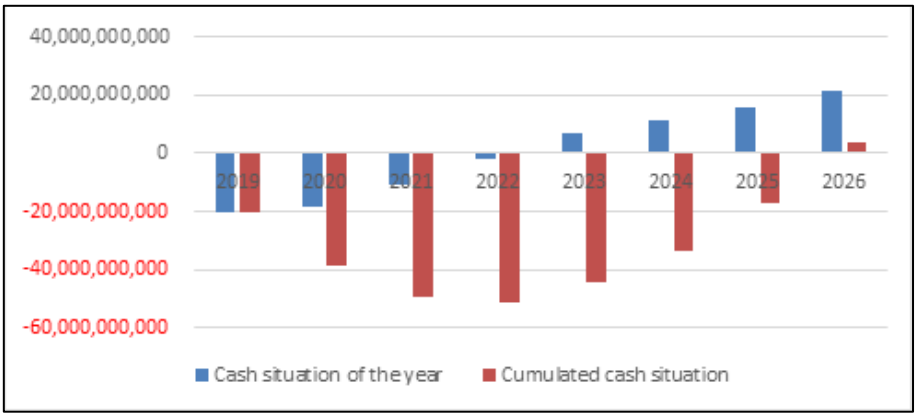


Figure D 7 WEs' cash situation (LBP)

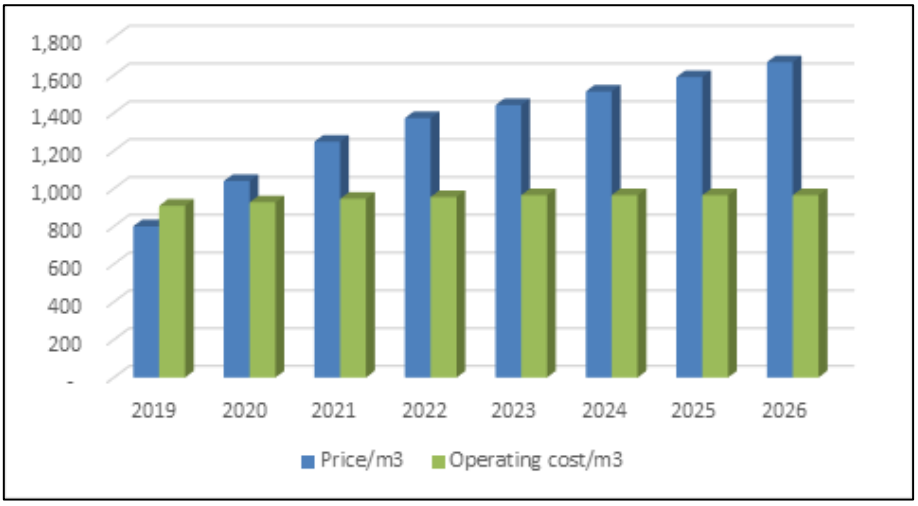


Figure D 8 Price/Cost per m³ (LBP)

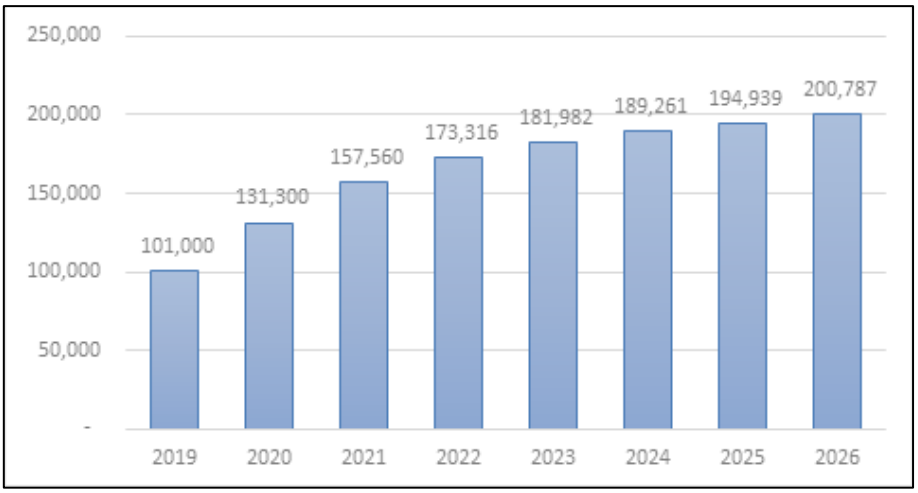


Figure D 9 Number of customers

Conversely, applying the same simulation with no increase of the average tariff level clearly shows how bad the situation would be. The same can be made using the other parameters.

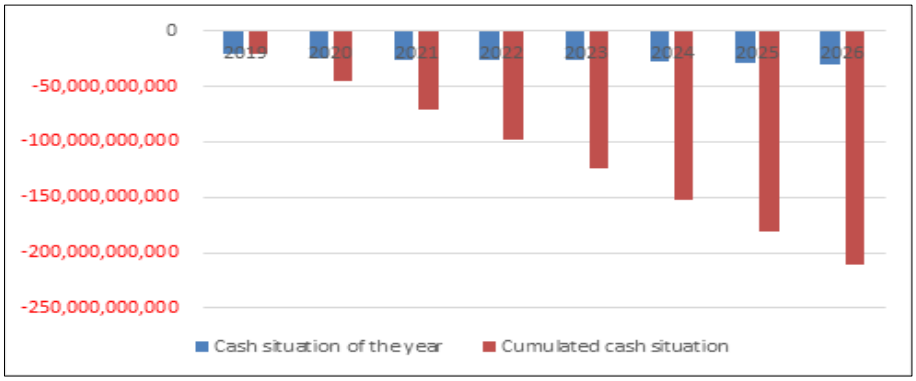


Figure D 10 WEs' cash situation

D.13.2 THE SPECIFIC CASE OF SLWE

D.13.2.1 SLWE baseline scenario and current situation

Table D 18 SLWE's typical baseline scenario

Baseline scenario 2018	
Nbr. of customers	168 000
Volume billed	61 320 000 m³
Average price/m³	851 LBP
Collection rate	52 %
Operating cost/m³	902 LBP

The current situation in SLWE can be depicted as follows:

- Significant number of customers tapping the water from unknown origin
- An operating cost/m³ higher than the average selling price
- A collection rate that is due to be increased

D.13.2.2 Projection for the period 2020 – 2026

Table D 19 SLWE's main assumptions considered for the period 2020 – 2026

Scenarios	2019	2020	2021	2022	2023	2024	2025	2026
Subscribers increase rate	1%	30%	20%	10%	5%	4%	3%	3%
Volume billed increase rate	1%	20%	20%	10%	10%	5%	4%	4%
Average tariff increase rate	0%	30%	20%	10%	5%	5%	5%	5%
Collection rate increase rate	1%	5%	15%	10%	10%			
Operating cost increase rate	1%	2%	2%	1%	1%			

The outcome of the simulation is as follows:

- Number of customers is due to increase from 169,000 to 337,000[4]
- Average selling price to increase 109% all over the considered period with a first 30% up front increase in 2020
- Treasury will enter into green territory by the year 2022
- Cumulative treasury to be positive by the year 2025
- Operating cost is to remain stable over the period through tight control of the NRW

Detailed features are given in APPENDIX D. 1.

D.13.3 THE SPECIFIC CASE OF NLWE

D.13.3.1 NLWE's baseline scenario and current situation

Table D 20 NLWE's typical baseline scenario

Baseline scenario 2018	
Nbr. of customers	124 793
Volume billed	47 599 650 m³
Average price/m³	667 LBP

[4] [4] Subject to customer census and transforming unknown customers into regular customers.

Collection rate	58 %
Operating cost/m^3	635 LBP

The current situation in the NLWE can be depicted as follows:

- Although figures are somehow unstable, it seems that there is a significant number of customers tapping the water from unknown origin, thus leaving the possibility to increase significantly the number of customers, open.
- An operating cost/m3 worth 635LBP, while selling cost is 667 LBP/m3, bearing in mind that, at the moment, NLWE does not pay any energy costs.
- A collection rate leaving room for progress.

D.13.3.2 Projection for the period 2020 – 2026

Table D 21 The NLWE's main assumptions considered for the period 2020 – 2026

Scenarios	2019	2020	2021	2022	2023	2024	2025	2026
Subscribers increase rate	1%	30%	20%	10%	5%	5%	5%	5%
Volume billed increase rate	1%	30%	20%	10%	10%	9%	9%	8%
Average tariff increase rate	0%	20%	15%	5%	5%	5%	5%	5%
Collection rate increase rate	1%	10%	15%	10%	5%			
Operating cost increase rate	1%	1%	1%	1%	1%			

The outcome of the simulation is as follows:

- Number of customers is due to increase from 126,000 to 260,000.
- Average selling price to increase 76% over the considered period (excluding energy cost)
- Treasury enters into green territory by the year 2021
- Cumulative treasury to be positive by the year 2023

Detailed features are given in APPENDIX D. 2.

D.13.4 THE SPECIFIC CASE OF BWE

D.13.4.1 BWE's baseline scenario and current situation

Table D 22 BWE's typical baseline scenario

Baseline scenario 2018	
Nbr. of customers	86 000
Volume billed	34 781 215

Average price/m^3	633
Collection rate	39%
Operating cost/m^3	629

The current situation in BWE can be depicted as follows:

- Number of customers (86,000) is very low whenever compared with EDZ (300,000). On top of that, 10,000 customers are not being billed since they are not supplied on a regular basis.
- There are many reasons to suspect that the number of consumers are tapping the water from the system without official connection.
- The average selling price is almost the same as the operation cost/m3 (includes energy cost).
- Collection rate is very low 39%.
- In 2018, the WE was granted an equilibrium subsidy from the Ministry worth 2,000,000,000 LBP which demonstrates how bad the financial situation of the WE is.

D.13.4.2 Projection for the period 2020 – 2026

Table D 23 BWE's main assumptions considered for the period 2020 – 2026

Scenarios	2019	2020	2021	2022	2023	2024	2025	2026
Subscribers increase rate	1%	30%	35%	20%	10%	5%	5%	5%
Volume billed increase rate	1%	35%	30%	20%	10%	9%	9%	8%
Average tariff increase rate	0%	30%	25%	10%	5%	5%	5%	5%
Collection rate increase rate	1%	5%	15%	15%	10%	10%		
Operating cost increase rate	1%	2%	2%	1%	1%			

The outcome of the simulation is as follows:

- Number of customers is due to increase from 86,000 to 233,000.
- Average selling price to increase 117% over the considered period with an up-front increase of 35% in 2020 (excluding energy cost).
- Treasury enters into green territory by the year 2023
- Cumulative treasury to be positive by the year 2026

Detailed features are given in APPENDIX D. 3.

D.13.5 THE SPECIFIC CASE OF BMLWE

D.13.5.1 BMLWE's baseline scenario and current situation

Table D 24 BWE's typical baseline scenario

Baseline scenario 2018	
Nbr. of customers	382 164
Volume billed	546 380
Average price/m^3	500
Collection rate	61%
Operating cost/m^3	409

The current situation in BMLWE can be depicted as follows:

- Number of customers is the highest in Lebanon with 382,000 customers although 942,000 households are recorded in the EDL customer database. Such comparison gives an approximate idea of illegal/unknown connections.
- Only 5% of customers are water-meter billed.

	Nbr. of customers	**%**
Nbr. of Gauges	361 576	95%
Nbr. of water meters	20 588	5%
Total Nbr. of customers	**382 164**	**100%**

Meanwhile BMLWE's management has put the water metering as a top priority. Business wise, 5% of the customers are producing 33% of the revenues, which demonstrates how profitable the water metering is and how profitable a generalization of the water meters would be.

Year 2018	Revenues LBP	%
Gauge water allowances for the current year	67 101 054 235	67%
Water allowances per meter for the current year	32 709 249 055	33%
TOTAL	99 810 303 290	100%

- Collection rate is reasonable whenever compared with other WEs, although there is an ambiguity regarding the total revenues (accrued or actually paid?)

YEAR	Total revenues (excl. tax and including recovery from previous years)	Collection %
2018	145 745 506 339 LBP	61.61 %
2017	146 512 993 668 LBP	60.95 %
2016	143 656 556 901 LBP	63.56 5

- As far as the reconciliation of technical, commercial and financial data are concerned, many inconsistencies should be pointed out. This refers mainly to the comparison between the volumes produced and billed. This should be further clarified.

	2018
Produced m^3/year	202 555 203
Billed/subscribed m^3/year	199 428 700
Theoretical yield %	**98,46 %**

Such unlikely yield of the distribution system has many causes that refer to:

- Uncertainty regarding the volume produced and entering into the system.
- Inaccuracy of the gauge system, which leads to deliver less than subscribed.
- The hydraulic stress in some specific areas whereby water is not available and nonetheless customers are included in the client database and the billing cycles lead to statistical distortions.

- Thanks to the water meter, the average selling price is at a satisfactory level where:

	2018
Average invoice/year/customer LBP	261 171
Average selling price: LBP/m^3	500
Cost of a m^3	409
Gross margin in %	18,2%

- The above-mentioned tabular presentation must be carefully read since financial statements released by BMLWE do not include energy, provision for activities outsourced and amortization. In other words, cost is not a full cost recovery.

D.13.5.2 Projection for the period 2020 – 2026

Table D 25 BMLWE's main assumptions considered for the period 2020 – 2026

Scenarios	2019	2020	2021	2022	2023	2024	2025	2026
Subscribers increase rate	1%	30%	30%	15%	5%	4%	3%	3%
Volume billed increase rate	1%	25%	25%	10%	10%	5%	4%	4%
Average tariff increase rate	0%	20%	20%	10%	5%	5%	5%	5%
Collection rate increase rate	1%	5%	15%	10%	10%			
Operating cost increase rate	5%	7%	10%	1%	1%			

The outcome of the simulation is as follows :

- Number of customers is due to increase from 380,000 to 869,000 over the mentioned period.
- Average selling price to increase 93% over the considered period with an up-front 20% increase in 2020. Such increase can be done by virtue of an official tariff increase and/or by virtue of increasing the number of meters at the consumer level.
- Theoretically, a tariff increase could be delayed or mitigated
- The treasury to enter into green territory by the year 2021
- Cumulated treasury to be positive by the year 2022

Detailed features are given in APPENDIX D. 4.

D.13.6 MAJOR CONCLUSIONS OF THE FINANCIAL RECOVERY EXERCISE

Although the financial simulations are somehow unstable due to the high level of uncertainties on the baseline situation combined with the assumptions made, it comes out that recovery of the WEs will require radical actions as described under the following tabular presentation over a period of 8 years.

WE	Est. of additional customers in % over 8 years	Increase of the tariff in % over 8 years	Collection rate in % from - to
SLWE	99%	109%	52% - 77%
NLWE	111%	76%	58% - 85%
BWE	171%	117%	39% - 67%
BMLWE	125%	93%	61% - 90%

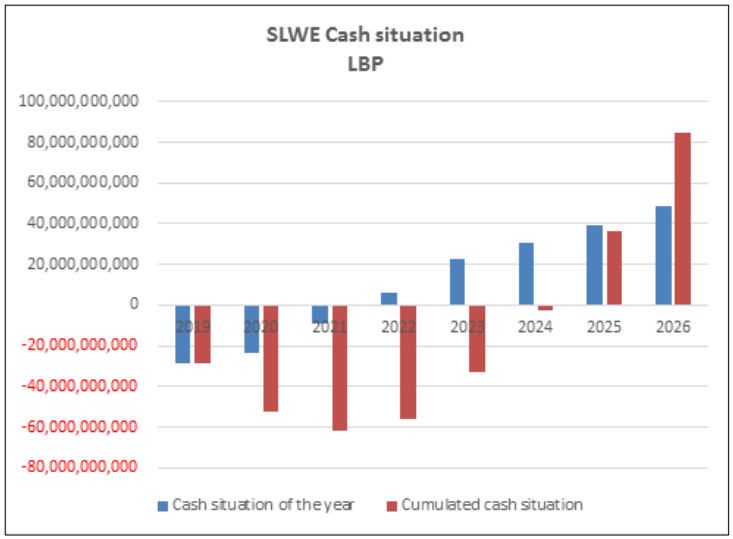
All these targets are only illustrative and the final packaging might be different, including keeping moderate tariff levels but increasing the number of metered connections and collection rate.

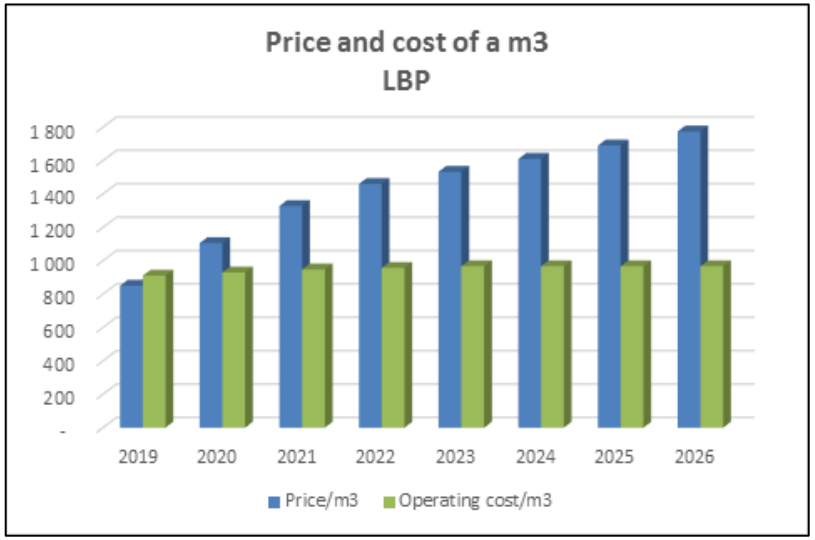
The general conclusion is that water tariff increase is not the ultimate solution. The financial recovery of the WEs will come out as a combination of actions including:

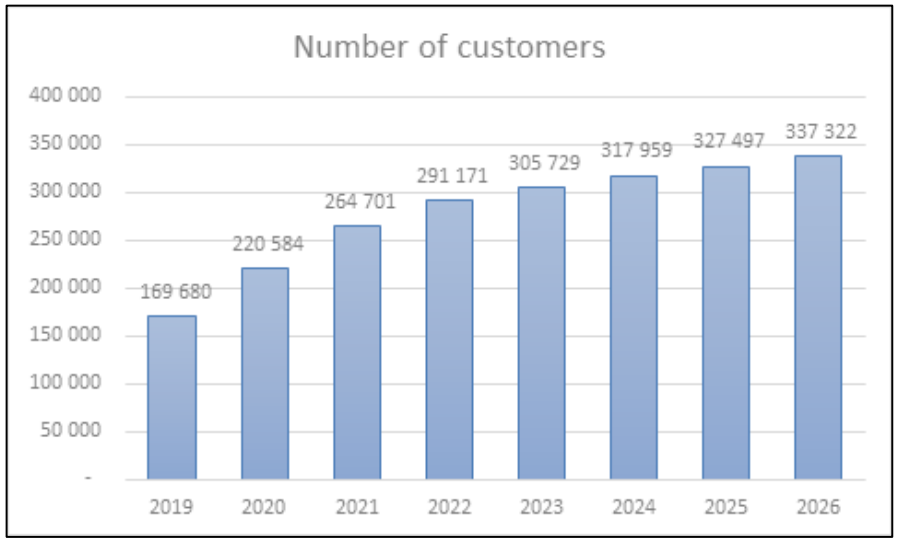
- Increasing the number of customers through customers census
- Progressively introducing the water metering and billing
- Increasing the collection rate through organizational measures (public awareness campaigns, bad debt management, partial payment and, ultimately, disconnection)
- Keeping a tight control over the UFW and operating cost.

APPENDIX D. 1 SLWE

		Baseline scenario 2018	2019	2020	2021	2022	2023	2024	2025	2026
Nber of customers	Nber	168 000	169 680	220 584	264 701	291 171	305 729	317 959	327 497	337 322
Volume billed	m3	61 320 000	61 933 200	74 319 840	89 183 808	98 102 189	107 912 408	113 308 028	117 840 349	122 553 963
Average price/m3	LBP	851	851	1 106	1 328	1 460	1 533	1 610	1 690	1 775
Collection rate	%	52%	53%	55%	63%	70%	77%	77%	77%	77%
Operating cost/m3	LBP	902	911	929	948	957	967	967	967	967
Accrued revenues	LBP		52 705 153 200	82 220 038 992	118 396 856 148	143 260 195 940	165 465 526 310	182 425 742 757	199 208 911 091	217 536 130 911
Actual revenues excluding arears	LBP		27 680 746 461	45 341 062 703	75 084 799 835	99 937 868 581	126 971 062 032	139 985 595 890	152 864 270 712	166 927 783 618
Total operating cost	LBP		56 422 383 864	69 060 997 850	84 530 661 368	93 913 564 780	104 337 970 470	109 554 868 994	113 937 063 753	118 494 546 304
Cash situation	LBP		-28 741 637 403	-23 719 935 147	-9 445 861 532	6 024 303 801	22 633 091 562	30 430 726 897	38 927 206 959	48 433 237 314
Cumulated cash situation	LBP		-28 741 637 403	-52 461 572 550	-61 907 434 083	-55 883 130 282	-33 250 038 720	-2 819 311 823	36 107 895 136	84 541 132 450

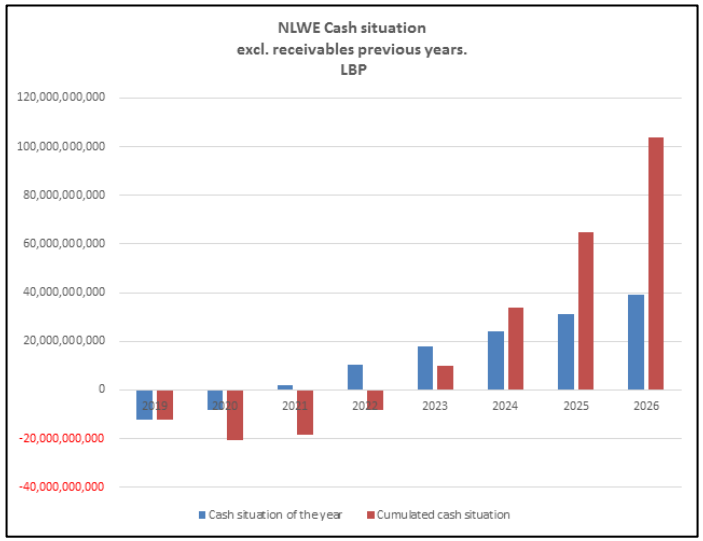

SLWE Cash situation
LBP
100,000,000,000
80,000,000,000
60,000,000,000
40,000,000,000
20,000,000,000
0
-20,000,000,000
-40,000,000,000
-60,000,000,000
-80,000,000,000
2019
2020
2021
2022
2023
2024
2025
2026
Cash situation of the year
Cumulated cash situation

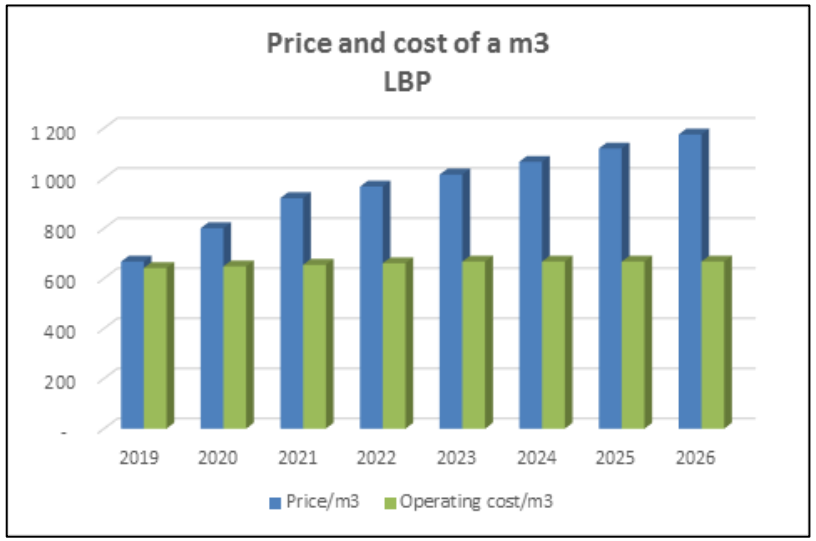

Price and cost of a m3
LBP
1 800
1 600
1 400
1 200
1 000
800
600
400
200
-
2019
2020
2021
2022
2023
2024
2025
2026
Price/m3
Operating cost/m3

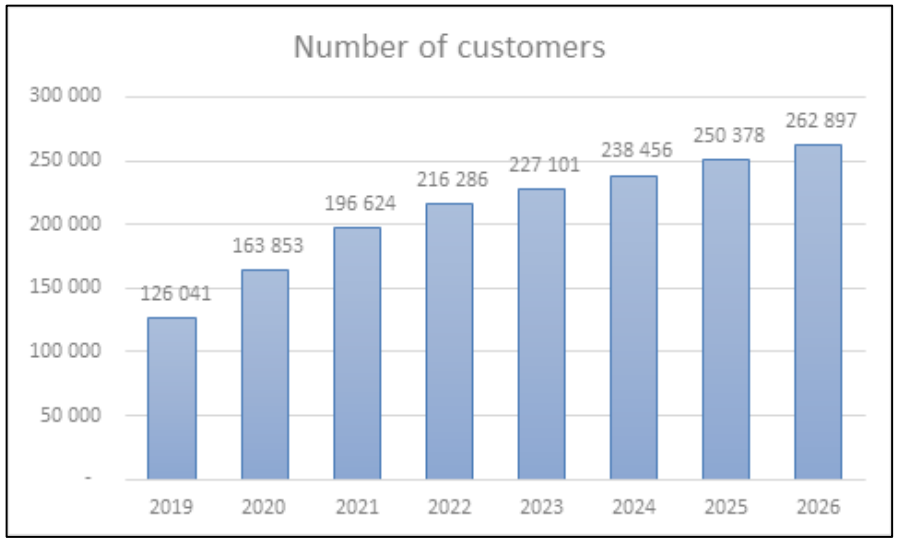

Number of customers
400 000
350 000
300 000
250 000
200 000
150 000
100 000
50 000
-
169 680
220 584
264 701
291 171
305 729
317 959
327 497
337 322
2019
2020
2021
2022
2023
2024
2025
2026

APPENDIX D. 2 NLWE

		Baseline scenario 2018	2019	2020	2021	2022	2023	2024	2025	2026
Nber of customers	Nber	124 793	126 041	163 853	196 624	216 286	227 101	238 456	250 378	262 897
Volume billed Est.	m3	47 599 650	48 075 647	62 498 340	74 998 009	82 497 809	90 747 590	98 914 873	107 817 212	116 442 589
Average price/m3	LBP	667	667	801	961	1 057	1 110	1 165	1 223	1 285
Collection rate of the year	%	58%	58%	64%	74%	81%	85%	85%	85%	85%
Operating cost/m3	LBP	635	641	648	654	661	668	668	668	668
Accrued revenues	LBP	31 756 695 199	32 074 262 151	50 035 848 956	72 051 622 496	87 182 463 220	100 695 745 019	115 246 280 175	131 899 367 660	149 573 882 926
Actual revenues excluding receivables previous years	LBP	18 361 753 587	18 730 824 834	32 142 095 415	53 227 310 008	70 845 549 620	85 917 940 302	98 333 082 676	112 542 213 122	127 622 869 681
Total operating cost	LBP	30 232 800 074	30 840 479 355	40 493 549 394	49 078 181 865	54 525 860 052	60 578 230 518	66 030 271 265	71 972 995 679	77 730 835 333
Cash situation	LBP		-12 109 654 521	-8 351 453 978	4 149 128 143	16 319 689 568	25 339 709 784	32 302 811 411	40 569 217 444	49 892 034 348
Cumulated cash situation	LBP		-12 109 654 521	-20 461 108 500	-16 311 980 357	7 709 211	25 347 418 995	57 650 230 406	98 219 447 850	148 111 482 197

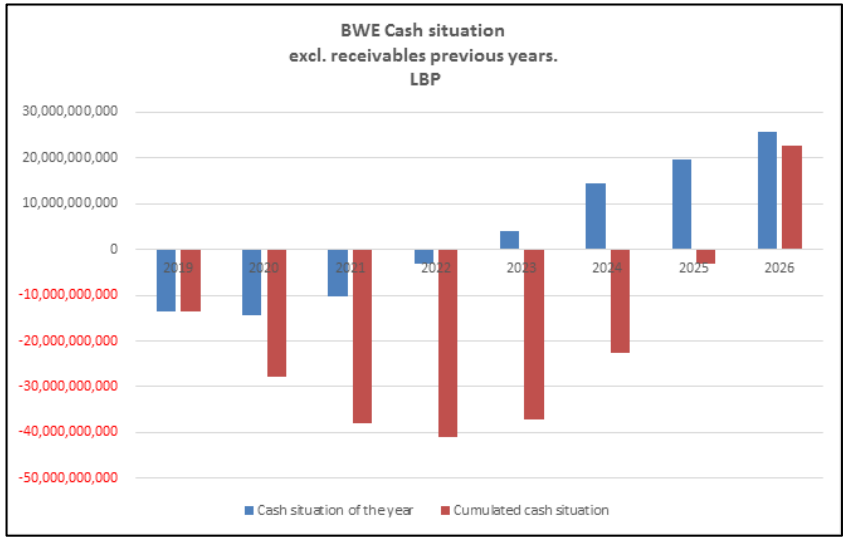

NLWE Cash situation
excl. receivables previous years.
LBP
120,000,000,000
100,000,000,000
80,000,000,000
60,000,000,000
40,000,000,000
20,000,000,000
0
-20,000,000,000
-40,000,000,000
2023
2024
2025
2026
Cash situation of the year
Cumulated cash situation

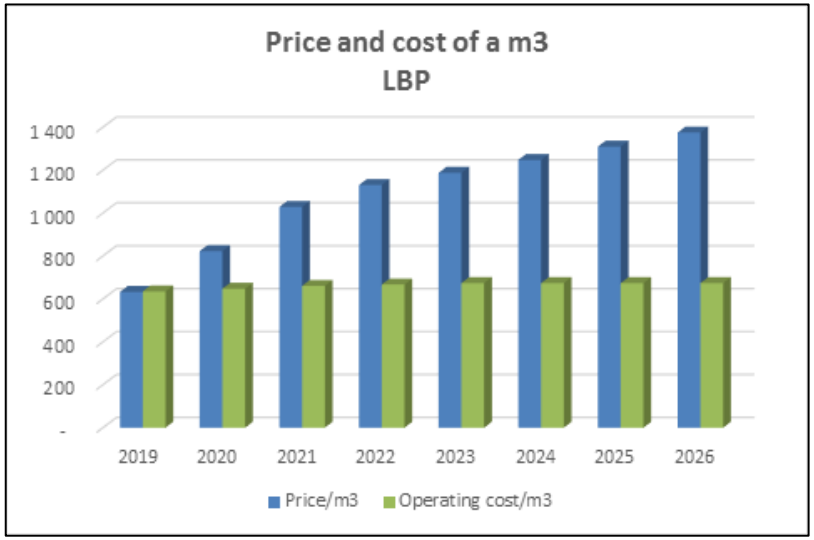

Price and cost of a m3
LBP
1 200
1 000
800
600
400
200
-
2019
2020
2021
2022
2023
2024
2025
2026
Price/m3
Operating cost/m3

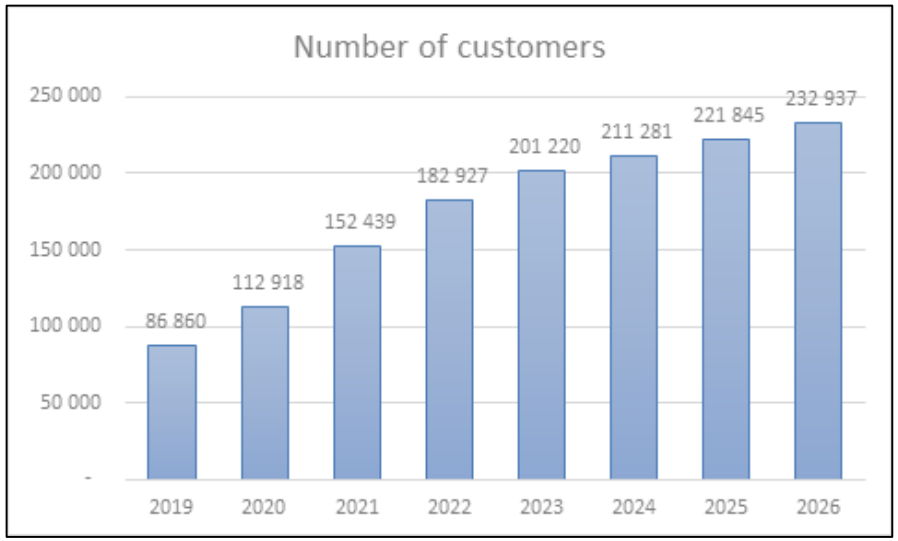

Number of customers
300 000
250 000
200 000
150 000
100 000
50 000
-
126 041
163 853
196 624
216 286
227 101
238 456
250 378
262 897
2019
2020
2021
2022
2023
2024
2025
2026

APPENDIX D. 3 BWE

		Baseline scenario 2018	2019	2020	2021	2022	2023	2024	2025	2026
Nber of customers	Nber	86 000	86 860	112 918	152 439	182 927	201 220	211 281	221 845	232 937
Volume billed Est.	m3	34 781 215	35 129 027	47 424 187	61 651 443	73 981 731	81 379 904	88 704 096	96 687 464	104 422 461
Average price/m3	LBP	633	633	823	1 029	1 131	1 188	1 247	1 310	1 375
Collection rate of the year	%	39%	40%	42%	48%	55%	61%	67%	67%	67%
Operating cost/m3	LBP	629	635	648	661	667	674	674	674	674
Accrued revenues (excl. Financial aid from Ministry) Est.	LBP	22 014 660 000	22 234 806 600	39 022 085 583	63 410 889 072	83 702 373 576	96 676 241 480	110 645 958 374	126 634 299 359	143 603 295 473
Actual revenues excluding receivables previous years	LBP	8 689 000 944	8 863 649 863	16 333 490 785	30 523 210 904	46 334 234 153	58 867 644 491	74 111 421 032	84 820 521 372	96 186 471 235
Total operating cost (including unpaid Energy)	LBP	21 867 292 424	22 306 825 002	30 716 498 027	40 730 076 384	49 364 852 578	54 844 351 214	59 780 342 823	65 160 573 677	70 373 419 571
Cash situation	LBP		-13 443 175 139	-14 383 007 242	-10 206 865 480	-3 030 618 425	4 023 293 277	14 331 078 209	19 659 947 694	25 813 051 664
Cumulated cash situation	LBP		-13 443 175 139	-27 826 182 381	-38 033 047 861	-41 063 666 286	-37 040 373 008	-22 709 294 799	-3 049 347 105	22 763 704 559

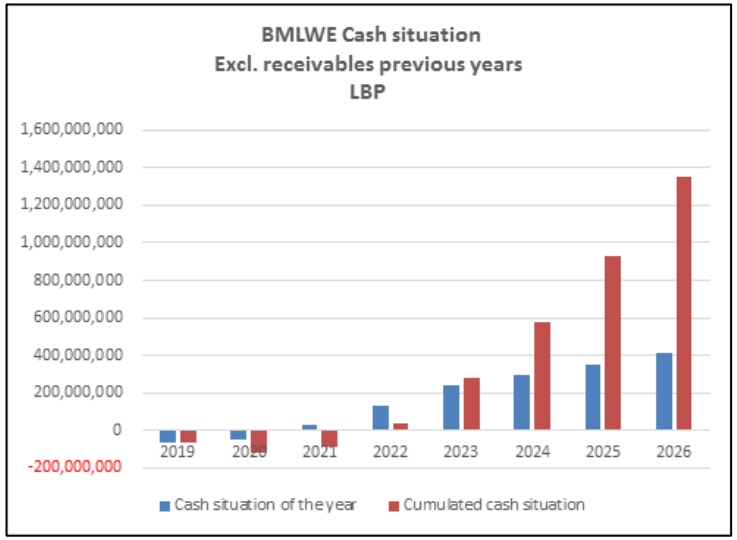

BWE Cash situation
excl. receivables previous years.
LBP
30,000,000,000
20,000,000,000
10,000,000,000
0
-10,000,000,000
-20,000,000,000
-30,000,000,000
-40,000,000,000
-50,000,000,000
2019
2020
2021
2022
2023
2024
2025
2026
Cash situation of the year
Cumulated cash situation

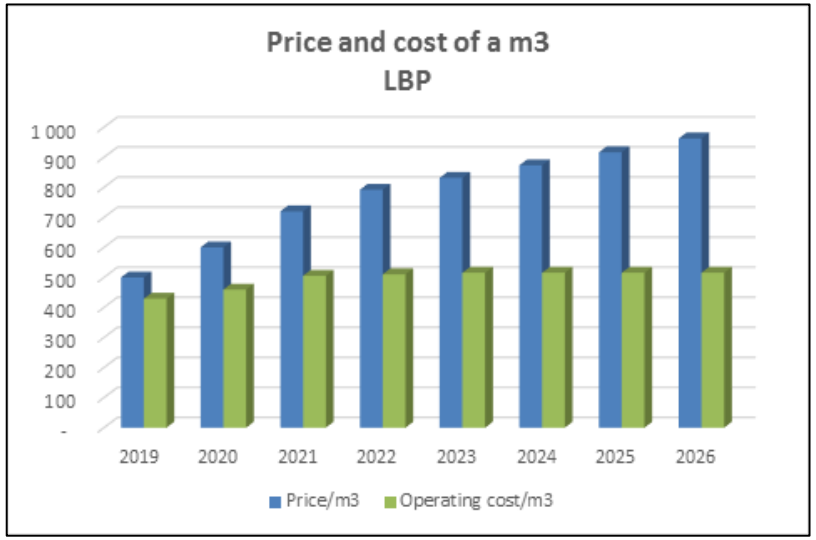

Price and cost of a m3
LBP
1 400
1 200
1 000
800
600
400
200
-
2019
2020
2021
2022
2023
2024
2025
2026
Price/m3
Operating cost/m3

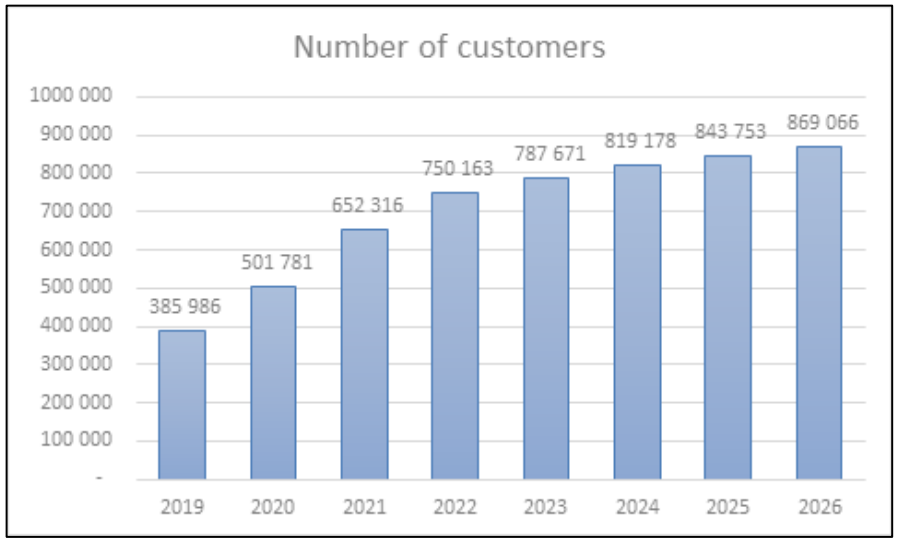

Number of customers
250 000
200 000
150 000
100 000
50 000
-
86 860
112 918
152 439
182 927
201 220
211 281
221 845
232 937
2019
2020
2021
2022
2023
2024
2025
2026

APPENDIX D. 4 BMLWE

		Baseline scenario 2018	2019	2020	2021	2022	2023	2024	2025	2026
Nber of customers	Nber	382 164	385 986	501 781	652 316	750 163	787 671	819 178	843 753	869 066
Volume billed	m3	546 380	551 844	689 805	862 256	948 482	1 043 330	1 095 496	1 139 316	1 184 889
Average price/m3	LBP	500	500	600	720	792	832	873	917	963
Collection rate	%	61%	62%	65%	74%	82%	90%	90%	90%	90%
Operating cost/m3	LBP	409	429	460	505	511	516	516	516	516
Accrued revenues	LBP		275 921 900	413 882 850	620 824 275	751 197 373	867 632 966	956 565 344	1 044 569 356	1 140 669 737
Actual revenues excluding arears	LBP		169 995 483	267 742 885	461 856 477	614 730 971	781 015 698	861 069 807	940 288 229	1 026 794 747
Total operating cost	LBP		236 989 320	316 973 215	435 838 171	484 216 208	537 964 207	564 862 418	587 456 914	610 955 191
Cash situation	LBP		-66 993 837	-49 230 330	26 018 306	130 514 762	243 051 491	296 207 390	352 831 315	415 839 556
Cumulated cash situation	LBP		-66 993 837	-116 224 168	-90 205 862	40 308 900	283 360 391	579 567 781	932 399 096	1 348 238 652


BMLWE Cash situation
Excl. receivables previous years
LBP
1,600,000,000
1,400,000,000
1,200,000,000
1,000,000,000
800,000,000
600,000,000
400,000,000
200,000,000
0
-200,000,000
2019
2020
2021
2022
2023
2024
2025
2026
Cash situation of the year
Cumulated cash situation


Price and cost of a m3
LBP
1 000
900
800
700
600
500
400
300
200
100
-
2019
2020
2021
2022
2023
2024
2025
2026
Price/m3
Operating cost/m3


Number of customers
1000 000
900 000
800 000
700 000
600 000
500 000
400 000
300 000
200 000
100 000
-
385 986
501 781
652 316
750 163
787 671
819 178
843 753
869 066
2019
2020
2021
2022
2023
2024
2025
2026

SECTION E
Strategic actions and recommendations

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E.1 COMPREHENSIVE VISION AND OBJECTIVES

E.1.1 TOWARDS A SUSTAINABLE AND INTEGRATED MANAGEMENT OF THE WATER SECTOR

The update of the NWSS is aligned with the National Water Sector strategy of 2012. It also takes into account adoption of the Water Code and its structuring principles, which are in turn in line with the water sector's structure, as defined by Law 221.

Developed in the context of the new Sustainable Development Goals, and in particular Goal 6, which aims to ensure access to water and sanitation for all, the updated NWSS is based on the following targets:

- 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all;
- 6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all, while paying special attention to the needs of women and girls and those in vulnerable situations;
- 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally;
- 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity, and considerably reduce the number of people suffering from water shortage;
- 6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate;
- 6.6 By 2030, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.

In order to meet these ambitious objectives, the vision of the strategy will be based on strengthening Integrated Water Resources Management (IWRM).

The Integrated Water Resources Management is a process that promotes the coordinated development and management of water, land and related resources to maximize economic and social welfare in an equitable manner, without compromising the sustainability of vital ecosystems and the environment. It takes into account the large water cycle and the interdependence between all water uses. It is thus a 'cross-sector policy' approach designed to replace the traditional fragmented 'sector-based' approach to water resources and management that has led to poor services and unsustainable resource use. The IWRM is based on the understanding that water resources are an integral component of the ecosystem, a natural resource, and a social and economic good.

This IWRMt-based strategic approach requires a paradigm shift. For years, sector development has focused on an infrastructure-based approach. This approach has led to:

- Sector monitoring that focuses on infrastructure rather than on users' access to services and service quality;

- Significant gaps between the infrastructure developed, and actual and sustainable access to the service;
- No anticipation of the facilities' operating and maintenance costs in the design and construction phase;
- Little consideration being paid to the technical and financial capacities of the service operator when designing the facilities.

Planning sustainable access to integrated water resources management means that infrastructure must be re-positioned as part of a more comprehensive system and not as a separate objective in itself. This requires taking the three links that make up the resource and service management chain into account:

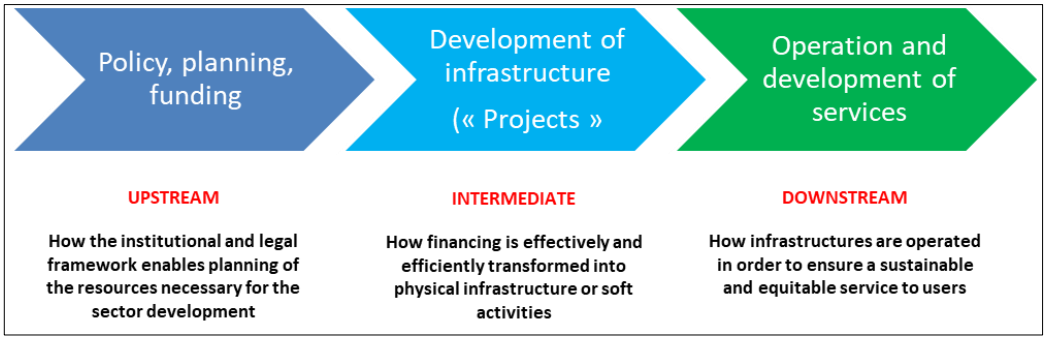

Figure E 1 Resource and service management chain

E.1.2 OBJECTIVES

E.1.2.1 General Objective

The general objective of this strategy, which plans the next 15 years of the water sector up to 2035, is to structure and develop sustainable water services to improve people's living conditions.

E.1.2.2 Specific Objectives

The achievement of the strategy's overall goal is based on the following specific objectives:

- Build an operational and sustainable institutional framework to ensure a proper management of the water sector, allowing the development of sustainable and efficient services.
- Develop financing tools for the sector to set-up financial mechanisms, allowing for the sustainability and financial balance of the services.
- Involve all actors in the service chain and establish sustainable mechanisms for collaboration and coordination to improve the sector's monitoring and transparency.

E.1.3 PILLAR OF THE UPDATED NWSS

E.1.3.1 Integrated Water Resources Management

Integrated Water Resources Management is the main background framework of the strategy. IWRM has several implementation principles that are included as core principles of the new Water Code. These principles are:

- The principle of equity
  Equitable treatment of all categories of the population, including the right of access to water and sanitation for all;

- The principle of subsidiarity
  Which aims to encourage resource mobilisation and user participation at the lowest possible level, develop skills to enable greater decentralisation of decision-making, and discourage centralised structures or monopolies from retaining full responsibility for the management of the country's water resources;

- The principle of information
  According to which everyone has the right to be informed of the state of water resources and participate in consultations and procedures prior to decisions being taken that are likely to have adverse effects on these resources;

- The principle of planning and participation
  Which aims to increase the involvement of users and partners in all water resources planning and management processes, while at the same time achieving transparency in decision-making and better implementation of joint decisions;

- The principle of sustainable development
  According to which water resources management must meet the environmental needs of the present without compromising the ability of future generations to meet their own needs;

- The principle of water management at river basin level
  Which is being used in some countries instead of administrative units as the framework for planning and participation (preparation of IWRM master plans), as well as water resources management/protection, coherently integrating all components of the natural water cycle and all its uses, including upstream/downstream relationships;

- The principle of cooperation
  According to which public authorities, international institutions, development partners, civil society and users contribute in an organised way to the management and protection of water resources;

- The precautionary principle
  Which refers to preventive measures taken to avoid or reduce any risk of water resources pollution or any threat to water resources when planning or carrying out activities that may have an impact on this natural environment and the communities that depend on it;

- The polluter-pays principle
  According to which the polluter should be charged for expenses relating not only to action taken to combat water pollution but also to preventive measures taken by the public authorities;

- The user-pays principle
  Which includes a set of defined rules that allow water consumption to be priced according to qualitative and quantitative uses;

- The principle of responsibility
  Which determines how society, individuals, and operators/WEs must assume their rights and duties with regard to water resources. This responsibility must be exercised by ensuring that current and future uses do not cause damage to the resource.

E.1.3.2 Users as key actors for implementing sustainable services

IWRM overlaps with the human rights-based approach to development and the combination of the two approaches, linked to the SDGs, tends to place the user at the heart of the strategy. Furthermore, the Water Code recognises "the principles of water law", namely sustainable water management and the right to water and sanitation. It is, therefore, necessary to ensure water conservation and distribution to the entire population and all production sectors.

This implies defining a strategy that is not based on objectives expressed in terms of the number of facilities to be built, but on objectives related to sustainable access to the water services by users. On the one hand, this starts with user consumption. On the other hand, it involves making these users responsible and identifies them as key actors in the functioning of the service.

The implementation of the strategy will, therefore, rely on a consumption-based approach to:

- Ensure access to the water service across socio-economic groups and different types of users throughout the country without geographical imbalance;
- Ensure equity in the distribution of water services;
- Send price signals to users about the relationship between water use and water scarcity.

And, as a knock-on effect:

- Improve facilities maintenance;
- Ensure transparency of the utilities' operations;
- Ensure better monitoring and management of service quality and the regulation of these services.

Through this approach, people should be made aware that they have the opportunity to improve their water consumption through a legal and more secure option in terms of water quality and continuity of access to water. This service offer will encourage people to abandon their use of any uncontrolled alternative systems that are harmful to the environment and will help improve:

- Preservation of natural resources and water services;
- The quality of the urban environment and health;
- Management of health crises and water stress/scarcity situations.

The incentive nature of the system seeks to make as much of the population as possible aware that the service provided by the WEs is more appropriate to their needs. To implement this system, effective communication mechanisms will need to be set up to provide information to the concerned population. Thus, IEC (Information, Education and Communication) will be an essential component for implementing this strategy. IEC actions are not only necessary for applying the principle of beneficiary empowerment, but also for building ownership of the strategy principles by each of the actors and for improving the distribution of roles.

In particular, each actor will:

- Need to be properly informed of their position in the sector's organisation;
- Need to be aware of the positioning of the other actors, in particular the users and the local contracting authority;
- Perhaps contribute to providing information and training other actors in order to help them fully play their role, and acquire the necessary capacities.

The information related to the strategy will thus target all communities in order to raise their awareness on the essential role the strategy allocates to users. It will also target actors from other sector (e.g. NGOs) to clarify the new positions to be adopted, as a result of the sector reform.

This reorganisation of the pricing system requires compliance with several principles. On the consumer side, it requires that the polluter-pays, user-pays and the beneficiary responsibility principles be respected. On the provider side, this system requires compliance with the principles of transparency and accountability.

Ultimately, the implementation of this system will establish a better balance between water use and water consumption within a regulated and monitored framework. Through developing the social equity principle, it will be possible to implement the two other core principles of IWRM, which are economic efficiency and environmental sustainability. Developing consumption power will help re-establish a virtuous circle for water services: first, the access, quality and efficiency of the service will be improved; and second, profitability for both users and providers will ensure the service's sustainability. In other words, this system seeks to reconcile efficiency and equity.

The principles of user pay, polluter pay and the role of the WEs are all identified in the Water Code.

E.2 STRATEGIC COMPONENTS

E.2.1 GENERAL

Six strategic components have been identified to improve the sustainable and integrated water resources management, presented in the previous section.

Figure E 2 The six strategic components

They constitute the strategic components that structure the Updated Water Sector Strategy. They are summarised in Figure E 1. Details are given in Appendix E.1

Table E 1 Summary of the Strategic Components

Strategic Component	Specific Objectives
Sector Governance	A.1 Implement the legal and regulatory framework reform (Water Code)
	A.2 Rationalize the tutelage framework with a view on the clear dispatching between operational and regulatory activities
	A.3 Develop proper mechanisms for performance monitoring
Financial and Commercial	B.1 Conduct a customer and user census
	B.2 Implement consumption-based tariffs for the water service
	B.3 Revise the tariff structure for sanitation services
	B.4 Revise the tariff structure for irrigation
Reporting and Monitoring	C.1 Enhance sector monitoring
	C.2 Enhance sector transparency
	C.3 Enhance sector coordination
	C.4 Enhance communication with users
Capacity-Building	D.1 Strengthen the MoEW monitoring capacities
	D.2 Streamline and structure WE internal organization and management
O&M of Facilities and Services	E.1 Improve operating cost control
	E.2 Enhance private sector involvement
	E.3 Adopt a shared wastewater management framework
Service Coverage	F.1 Enhance water service coverage
	F.2 Enhance wastewater service coverage
	F.3 Structure the irrigation service

E.2.2 SECTOR GOVERNANCE

E.2.2.1 Challenges

Water sector governance involves different actors. The current dilution of responsibilities and the lack of communication and coordination between institutions exacerbate sector governance challenges.

The current approach involves administrative and close supervision of the WEs and does not focus on monitoring their performance, which means it suffers from a loss of purpose and effectiveness. On the one hand, the MoEW spends lot of time validating procedures that are almost part of the WE's day-to-day management, and on the other hand, WEs are constrained and restricted in their ability to develop their institution further or manage their daily affairs. Streamlining this supervision should make it possible to reduce both the burden of tighter control for the Ministry and the number of obstacles and bottlenecks encountered by the WEs when conducting their activities.

WEs are faced with a very challenging situation:

- Their internal structure (as defined by their organizational decrees) is more inclined towards the direct management of facilities and services;
- However, they are unable to recruit the staff required by the decrees to fulfil their roles, or even to replace retiring employees, as there is a freeze on all recruitments through the Civil Servant Council;
- They partly fill the gaps through existing team members, but some are underqualified or underpaid for certain tasks and others end up carrying out operational tasks instead of working on technical and strategic areas;
- They also recruit temporary staff which poses challenges due to the precarious nature of these positions and the fact that provisional workers differ in status from permanent staff;
- They have to manage wastewater and irrigation, but their current organizational chart and the staffing plan defined by the organizational decrees do not include these services (no dedicated department or team, and no staff with specific qualifications and skills listed), which means that, not only are they already understaffed and/or inadequately staffed for delivering water supply services but they also have to provide two other challenging services;
- They should be involved in designing and supervising the water, wastewater and irrigation projects implemented in their region but do not have enough skilled staff to be involved in these projects;
- Finally, they need to outsource some of their tasks to private operators, but lack an efficient and effective contracting framework and internal technical skills to properly supervise private operators.

E.2.2.2 Actions to undertake

To address these challenges, three sub-objectives have been defined:

- Implement the legal and regulatory framework reform (Water Code);
- Rationalize the administrative supervision framework;
- Develop proper mechanisms for performance monitoring.

Implement the legal and regulatory framework reform (Water Code)

The implementation of the Water Code requires several decrees to be adopted or reviewed, such as:

- Decree on vested rights over water;
- Composition and organization of the National Water Council;
- Preparation of planning in the water sector;
- Operations subject to authorizations or declarations;
- Tariffs and fees regime;
- Public water service delegation types and arrangements;
- Public utility services in flood-risk areas;
- Prevention of water deficits;
- Reuse of treated wastewater.

Specific studies will need to be conducted for some decrees (such as the tariffs and fees regime), which could be defined in the short term. Other decrees may be developed just after the final adoption of the latest version of the Water Code (currently being reviewed by Parliament).

Rationalizing the administrative supervision framework

The administrative supervision framework will be reviewed at two levels:

1. Restructuring the Ministry's supervisory functions
   With more focus on WEs' performance monitoring and introducing a substitute function in the event of their failure (including, for example, direct procurement of external audits if not conducted by WEs and cost deduction from their budget).

2. Reviewing the WE's organizational and operating decrees

Those decrees should focus on defining guidelines for the WE's organization and streamlining specific parts of the reform implementation, which would involve reviewing the current WE organization and operating decrees. This review will feed into the second sub-objective of the sector's governance strategic component: rationalizing the administrative supervision framework.

Thus, all the WE's organizational and operating decrees need to be revised, and their scope needs to be changed as follows:

- Instead of pre-defining an operating model, WEs should be granted the freedom to develop the most appropriate service management model: direct management of certain tasks or delegation to the private sector of other identified tasks;
- The organizational decrees should include fewer details (number of staff, precise organizational set-up of the WE), while setting out the main orientations (strategy, results and performance-based management approach, staff recruitment thresholds… etc.), and the WEs' ability to develop their organizational charts in line with their evolving needs;
- The HR recruitment process should be simplified and include the option of enhancing recruitment outside the public service procedures;
- Focus should be on monitoring the WEs' performance and defining guidelines for their performance monitoring;
- Guidelines for procurement management and the management of performance-based contracts need to be defined, and expenditure and procurement validation thresholds should be raised;
- Guidelines should be defined for pricing the services, and the validation procedure needs to be simplified.

Producing and implementing these decrees is a high priority (by 2022) but, as they depend on the results of specific strategic studies or technical support, some of the decrees might be reviewed in part in the short term (by 2025). The priority is to launch the studies and support programmes as soon as the strategy is adopted.

Finally, in order to support the administrative supervision department, a specific assessment of the department's roles and capacities will be carried out as soon as the strategy is adopted. This assessment will need to be coordinated with the legal process for reviewing the decrees, to ensure that their provisions are adapted to the department's capacities. This assessment will inform the design of a specific staff capacity-building plan (including profiles and priorities for recruitment) that will be implemented over four to five years.

Developing proper mechanisms for performance monitoring

The development of a framework for WE performance monitoring is a key factor for improving the efficiency of administrative supervision. This framework development has to be carried out progressively through specific support provided to the MoEW and the WE.

The main actions to be undertaken are as follows:

1. Set up a unit coordinate and supervise the implementation of the NWSS (this strategy)

2. Set up a unit in charge of performance monitoring within the MoEW's administrative supervision department.
   This unit will be composed of internal administrative supervision department staff (who will be trained on performance monitoring) and a long-term technical assistance unit (TA) to support the Ministry and the WE in developing a shared performance monitoring framework.

3. Standardize the structure of reports and audits.
   The TA will support the Ministry and the WE in structuring three types of reports:

   - Annual activity reports
     Including the financial and business reports already prepared by the WE but which need to be standardized to enable the Ministry to cross-reference data and results.

   - Monthly activity reports.
     These are new and will be introduced with the aim of developing a culture of reporting and transparency on key activities and performance indicators. With TA support, the MoEW and WE will define the structure of these reports, as well as their submission and validation procedures.

   - Annual external audit and evaluation of the WE.
     It is proposed that the WE appoints an auditor at the end of the first year of the strategy, and that the monitoring and supervision TA reviews the first reports and ToRs, as well as works to improve and standardize the initial framework. The annual WE's external evaluation is a new provision that will be added to the administrative supervision decrees. The aim of this evaluation will be to review the activities implemented, identify bottlenecks and blockages, and produce recommendations to improve services and internal operating methods.

4. Progressively develop a framework for performance monitoring within each WE.
   With the support of the dedicated technical assistance, the MoEW and the WE will progressively develop a shared framework for performance monitoring.
   The first step will involve assessing the monitoring capacities of each WE in order to define basic key performance indicators to be monitored, and to set targets for developing improved indicators within an achievable timeframe. Indicators will be reviewed and progressively developed after four years, in order to be able to set contractual KPI and establish performance-based contracts between the MoEW and the WEs.

   Two complementary measures will be implemented to start the unit's monitoring activities:

   - Introduction of a monthly management pack based on technical and financial data including a red flag type highlighting major problems and negative trends;
   - Periodic benchmarking between the four WEs for easier assessment of trends and understanding of deviation

E.2.3 FINANCIAL AND COMMERCIAL

E.2.3.1 Challenges

1. In the financial and commercial fields, the key issues refer to introducing International Financial Reporting Standards for all WEs, together with an annual audit of the financial statements and ledgers by an international independent audit firm. Such an approach will ensure the transparency of financial statements and pave the way for proper monitoring of the utilities and fair comparison of performances.

2. As part of the exercise for improving collection rate and financial performances of the WEs, tackling the issue of the water metering and billing is another subject which will require specific actions. The current gauge system is inaccurate and produces side effects both on the technical (no measurement of NRW and over consumption) and the financial sides (efforts made for keeping control of NRW is not financially rewarded). On top of that, the gauge system leads to wasting water. The objective is then to introduce water meters on a large scale targeting 100% of households by the end of 2035. Meanwhile, many installed water meters are not read and it seems that there is some reluctance vis-à-vis the metering system. Such issue needs to be addressed.

3. On the commercial side, the top priority is to bridge the gap between the number of official customers as existing in the various customer databases and the actual population tapping from the network. The current situation demonstrates that a lot of households/dwellings are supplied from unknown origins and this refers to private wells or multiple connections (Spaghetti network), or even wrong allocation within the database down to illegal connections. Therefore, the idea is to carry out a systematic customer census with the view to detect and attract new customers and include them into the connection and billing system. Expected output is to increase revenues of the WEs with no real additional operating cost. For the wastewater management, users of the services need to be identified and registered in specific databases, since, in some regions, not all users of wastewater services (households connected to sewage networks and ultimately to treatment plants) are subscribers to the service of WEs. It is therefore essential to be able to cross-reference the database of subscribers to the WEs with the database of users of wastewater services. A specific pricing and collection of the sanitation fee system will have to be applied to those who are not yet WEs subscribers.

E.2.3.2 Actions to undertake

Addressing the installation of water meter

It is a long-term process encompassing the following actions:

- Streamlining the water meter reading and billing process will require changing the existing system which combines gauges and water metering. The current rationale being to charge only the excess of consumption (i.e. the amount of water above the gauge allocation). The objective of the new system is to charge the customers based on their exact consumption.

- Marketing the water metering as a modern way to save water, monitoring meters' installation within each WE as well as the progress made
- Introducing district metering as a priority
- Introducing customer management procedures for water meters reading
- Assessing the cost of the water and wastewater, and adjust the water and wastewater tariffs, accordingly
- Introducing wastewater fee proportionally to the water consumed and defining a specific wastewater fee for households that are not subscribing to the WEs
- Gradually introducing a new category of customers targeting big consumers (industrials, hotels and others to be identified) with a specific tariff level. Possibly introduce block tariffs with a specific rate, the rationale being that first one starts off low and increases gradually with higher consumption.

The whole process described above is the essence of sector reform that will concentrate on (i) tariff level and structure for water and wastewater, (ii) water metering and (iii) assistance to customer management.

Conducting customers' and users' census

1. Water services customers' census

   The purpose is to carry out a systematic visit to all dwellings of the target zone to investigate:

   - The origin of the potable water
   - The adequacy with the WE database (subscription code)
   - The good/bad state of the connection
   - The geotag of the connection (gauge and water meters), if possible
   - Detection of illegal connections or ones shared among many families (unauthorized connections)

   As a first step, such census will concentrate on specific limited areas (rural and urban) in a sample WE, and based on results, a possible extension to other target zones can be planned. The customer census must be carried out in full coordination with the WEs in order to welcome the new customers and transform their status into a legal one. This will require a specific action ranging from payment of the connection fees down to the actual connection and installation of water meters and gauges. At this stage, it is worth pointing out that customer census must be accompanied by a specifically designed information and communication campaign.

   Success of customer census is guaranteed if connection works (saddle, connection pipes, installation of gauges and water meters) are carried out within a short timeframe after the investigators' visit. This requires human, logistical and financial means made available by WEs

or the Ministry. The option of outsourcing to private contractors is also to be considered as a means to ensure a quick result.

Following this census, specific measures may be adopted in order to support the legalization of illegal connections: declaration of a three months grace period for customers who declare illegal connections plus a one-year target for all utilities to sign payment plans for all bad debtors.

2. Wastewater services users' census

The objective of this census is to identify the users of wastewater services and to identify those who are already subscribers to the WEs' and those who are not. Priority zones will be defined based on the following:

- Priority 1: Existence of a collection network and operating wastewater treatment plant (or pre-treatment plant)
- Priority 2: On-going projects for the construction of a wastewater management system (networks and plant) - the census should be a component of the projects
- Priority 3: Planned projects for the construction of wastewater management system

The census will be based on:

- Cartographic identification of buildings located in the collection area (in close collaboration with the CDR and municipalities) and pre-identification with the WEs of area where households are not subscribing to the WEs
- Field visit and geotag of buildings identifying actual connections and building that are not yet connected - municipalities might have information on the status of the households and should be involved in the field visits
- Cross-checking with the WEs' existing customers databases

A specifically designed information and communication campaign must accompany the conduct of the census.

E.2.4 REPORTING AND MONITORING

E.2.4.1 Challenges

Monitoring and evaluation is a key element of the strategy, as it makes it possible to adapt the set objectives, based on the results obtained at mid-term and to inform the discussion and strategic decision-making process at a ministerial level.

The MoEW and WEs currently have very limited capacities for producing technical reviews or for monitoring actions across the entire sector chain (water collection, storage, distribution and recycling) and the country, as there is no specific body or staff dedicated to conducting this activity.

Moreover, current data is either incomplete or full of discrepancies to enable systematic monitoring nationwide. It is, therefore, essential that strategies and tools are developed for sector reporting,

monitoring and evaluation, and that all stakeholders are involved, in order to establish an accurate benchmark, and measure progress and concrete impacts of the strategy over the long run. In particular, indicators for sector monitoring and good coordination between the MoEW and the WE are required.

One of the highest priorities of this strategy is, consequently, to develop a proper performance monitoring mechanism at both the MoEW and the WEs' levels.

E.2.4.2 Actions to undertake

The following actions should be carried out:

- Implementation of a dynamic and efficient monitoring and evaluation system for the sector, including harmonizing existing monitoring systems and defining monitoring indicators. Reporting on the indicators should take place at key stages in the service production chain.

  This system will include the organizational structure (actors, roles and responsibilities), the database, the indicators to be monitored, the data collection plan, the communication and data dissemination plan and the training plan for training staff on the use of the various tools. This sector monitoring and evaluation system will be managed at the central and regional level. It will gradually be expanded nationwide and will be implemented in stages. A distinction will be made between key and secondary indicators (measured at different frequencies, although the baseline will cover all indicators to define the benchmark).
- Collaboration with the Ministry of Environment to set up a system for monitoring the quality of water resources. This will require the definition of a quality objective for groundwater and surface water resources.
- Monitoring and evaluation of the strategy, and action plan implementation. In order to assess progress, the monitoring and evaluation mechanism will include specific indicators related to implementation of the strategy and action plan.

The activities to be developed are as follows:

- Enhance sector monitoring
- Enhance sector transparency
- Enhance sector coordination
- Enhance communication with users

Enhance sector monitoring

1. Create a monitoring department within the MoEW

   The objective here is to set up a team within the Ministry itself, exclusively dedicated to monitoring. This function will be established by reviewing the MoEW's organizational decree and creating a new monitoring department. A specific long-term Technical Assistant will also be recruited to work within this department and support the Ministry with progressively developing the monitoring framework.

At the planning stage, the TA will develop suitable monitoring tools and key indicators. They will also coordinate the monitoring and evaluation process within the WE.

2. Establish a unified database to include all sector monitoring data and ensure it is regularly updated (including the WE KPI)

   This database shall include all specific sector data on water resources, water quality, water uses, management of water, wastewater and irrigation services (as part of the WE KPI to be collected and harmonized within this unified database managed by the Ministry), status of infrastructure projects and financing tools of the sector.

   Building this database involves a substantial amount of work and is a continuous activity that must be initiated as quickly as possible in order to provide data for the annual evaluation of the strategy's objectives and benchmarks.

   This database will contain data collected at national and regional levels. At the regional level, a consistent basis will need to be established, along with standardized reports that will be the same for each region to harmonise the results.

   The WEs' monitoring capacities will be assessed in order to collect all existing indicators, identify gaps and develop a harmonised approach to be shared by the MoEW, all WEs and the LRA.

   A specific approach will have to be developed for the asset management based on good international practices:

   - Set up asset registers (GIS)
   - Link technical data with financial data (asset cost, depreciation plans… etc.) and operation data (leaks monitoring)
   - Identify strategic assets
   - Periodic asset assessment in connection with investment planning
   - Conduct financial valuation of assets and gradual inclusion of asset depreciation in the tariffs' long term process to achieve full cost recovery

   Indicators on WEs' performance will be part of this database as they will be the main monitoring tools used to report on progress made in terms of commitments. They will make it possible to accurately monitor achievement of the objectives and their impacts.

   The role of these indicators is to:

   - Provide information on WE activity over time;
   - Identify gaps;
   - Provide transparency and mutual accountability between stakeholders - MoEW, WEs, local authorities and users;
   - Establish feedback mechanisms by the Ministry and the WEs;
   - Ensure WE involvement in sector reform.

The WEs' monitoring capacities assessment will be carried out by the Technical Assistance working within the monitoring department, based on available indicators.

3. Set up an annual sector review involving the main stakeholders and partners

   Joint annual water sector review is a useful mechanism to review progress in the sector and identify issues that need to be addressed to improve performance.

   The annual review provides a common basis for understanding water sector issues and priorities. Findings and recommendations can be followed up through action plans and policy dialogue. Annual reviews are usually used in the context of a medium-term water strategic plan and monitor progress against the annual plan. Beyond this core monitoring role, they often select specific topics which require analysis to identify how to improve performance.

   An annual sector review will be set up every mid-year and involve the main stakeholders and partners (i.e. international donors and main NGOs).

4. Set up a process for monitoring the strategy implementation status

   Monitoring strategy implementation and its effectiveness is a continuous process that will provide an objective assessment of the strategy's success. More precisely, the monitoring of the strategy is essential for:

   - Ensuring that intermediary goals are achieved;
   - Tracking inputs, activities and outputs;
   - Alerting management to problems or potential problems before the situation becomes critical;
   - Suggesting corrective action to ensure that performance conforms to the strategy, that the strategy is revised in light of new experiences and that the database is built up.

   An internal assessment of the strategy implementation will be done in 2025. The results will be shared with all stakeholders and partners during the annual review of mid-2025.

Enhance sector transparency

The increased transparency of the sector is the result of mechanisms put in place through other fields of action. Transparency will depend on effective transmission of reports and publication of key figures for the sector.

The following elements and processes will increase sectoral transparency:

- Ensure a transparent flow of information between the WE and the MoEW through regular reporting (annual report, financial report and commercial report);
- Publish annual WE reports (including the results of audits performed by independent auditors);
- Publish financial reports based on IFRS's book-keeping standards;
- Publish the main sector indicators, ensuring these are updated on a regular basis;

- Publish the breakdown of the water bill;
- Develop E-governance and publish all procedures online;
- Ensure clear procurement procedures, transparent tenders' evaluations and reliable unit cost rates.

Enhance sector coordination

Enhancement of the sector coordination will be mainly based on the following:

- Improvement of coordination between CDR, the MoEW and the WEs on infrastructure project planning and management. This implies setting up mechanisms in order for the three institutions to coordinate on infrastructure projects (design of facilities, anticipation of operating costs and arrangements for the facilities' takeover, the needs of institutions in terms of support and capacity building, communication methods with users and local actors… etc.).
- Set up of an annual sector review involving all stakeholders and partners (see previous paragraph)
- Set up the National Water Council as defined in the Water Code and its By-Laws
- Improvement of coordination with other key sector ministries and actors on specific subjects as defined by the Water Code.

Enhance communication with users

Communication with users is a key element for service sustainability. The following activities will be implemented:

- Assessing existing tools and communication strategy of the MoEW and the Wes, and coordinating with other programs aiming to support those actors in their communication with users;
- Defining the main indicators and messages to be communicated to the public and channels of communication (MoEW's website, WEs' websites or social media… etc.);
- Developing social media platforms and websites;
- Designing and launching a national communication campaign on the water sector.

E.2.5 CAPACITY-BUILDING

E.2.5.1 Challenges

The notion of capacity-building is fundamental to the future of the sector. There is no point in planning activities or investments if the sector does not have the human and technical resources required to implement them.

Currently, an average of only 23% of the positions defined in the decrees are occupied by permanent staff within the four WEs (20% for NLWE, 12% for SLWE, 37% for BMLWE and 23% for BWE). All WEs recruit temporary staff to fill some positions but the sum of permanent and temporary staff combined

only covers 50% of the planned positions (49% in NLWE, 51% in SLWE and 52% in BWE). In addition, all WEs have a shortage of qualified staff. Furthermore, 55% of permanent staff members in position have no degree or certificate and only 5% of them carry advanced degrees in engineering, which is very low considering the technical tasks that WEs have to carry out, especially in the wastewater sector that has no specialized employees.

The MoEW is also understaffed and lacks qualified and technical staff who are able to properly supervise the work of the WE and ensure the sector's overall management.

Within this context, the sector development and the capacity building of the four WEs, the Litani River Authority and the MoEW depend on the capacity of these institutions to recruit qualified staff in the short-term.

E.2.5.2 Actions to undertake

Capacity building is not limited to training existing staff or providing operational facilities. First, the strategy must focus on developing human resources and recruit qualified staff, which must be done in coordination with sector partners.

The strategy will focus on seeking to improve the MoEW's monitoring capacities at the sector level (within the new Monitoring Department) and at the WE supervision level. The strategy will also aim to develop the capacities of the WEs as described hereafter:

Develop monitoring capacities

Activities to develop monitoring capacities will be based on the following main actions, as previously detailed:

1. Appointing a specific technical assistance at the MoEW for development of monitoring mechanisms

   Once the monitoring department has been set up within the MoEW and technical staff have been recruited or appointed, a specific long-term technical assistant position will be created and filled to support the development of the sector's monitoring framework.

2. Supporting the MoEW with defining sector key performance indicators (KPI).

3. Supporting the MoEW and the WE with developing a performance-monitoring framework.

   A specific technical assistance unit will be set up within the administrative supervision department to support the MoEW's staff and the WE, through progressively designing and developing this framework.

4. Identifying the MoEW's staff members to be trained and supported in monitoring activities.

   The MoEW's workers will receive specific support and training to manage the databases, the monitoring indicators and the procedures to be applied.

These actions should enable the MoEW staff to progressively develop their sector monitoring skills, ensure consistency and grow a new culture of performance-based supervision. The introduction of technical assistance within the Ministry to support both the monitoring and administrative supervision

departments should help ensure that the framework and processes defined are being adapted to the existing and evolving capacities of the MoEW and the WE.

Figure E 3 shows synthetized schematic of the overall structure of the sector-monitoring framework

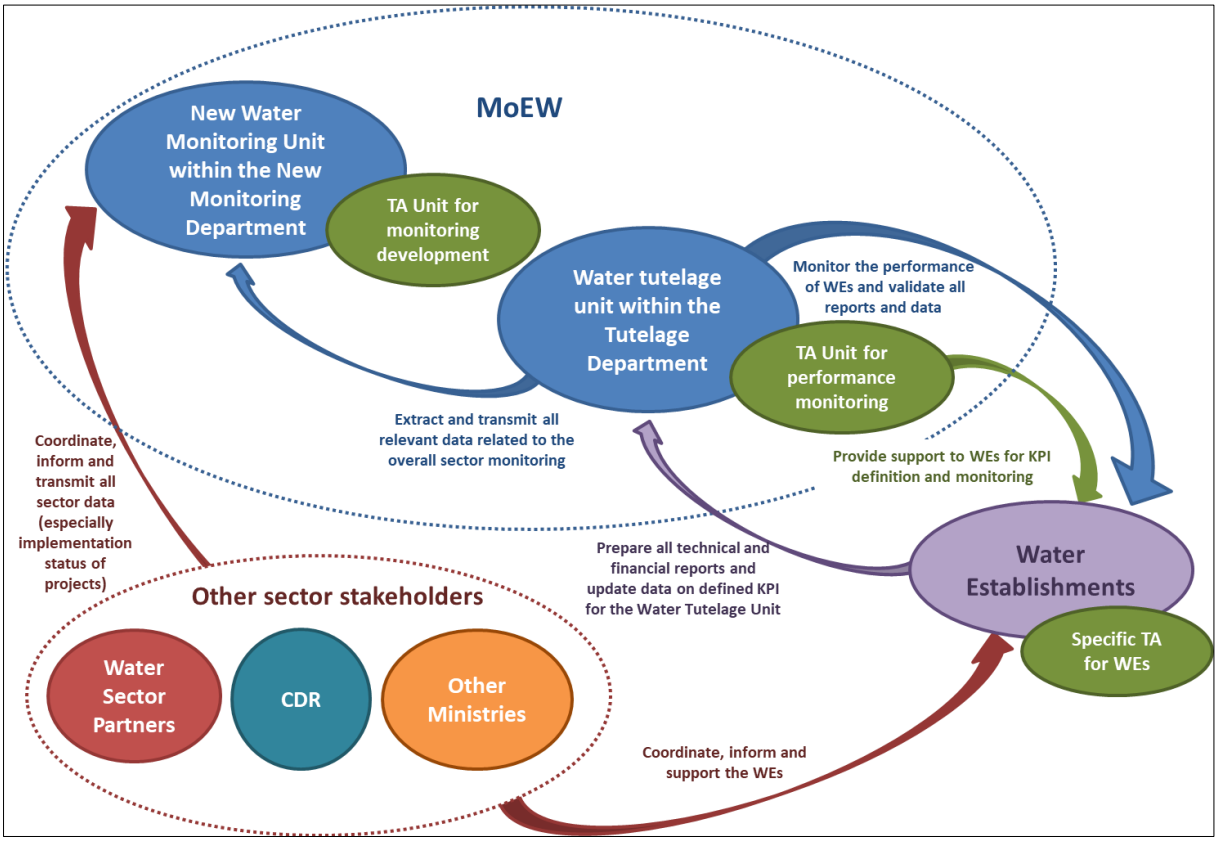

Figure E 3 Overall structure of the sector-monitoring framework

Streamline and structure of the WEs' internal organization and management

Activities will include conducting an overall internal audit in each WE (organizational, HR management, financial - assets, commercial, technical), and proposing measures and guidelines for streamlining the WE's internal organization.

A specific external pool of experts specializing in water utilities management, planning, HR, finance and accounting, and institutional water sector management will conduct this assessment and will need to coordinate with the legal experts/advisors in charge of preparing the WE's decrees.

This action is of high priority, as it will provide a more thorough analysis of the WE's internal working methods and identify its most urgent organizational, recruitment and support needs for improving service management. It will also inform the work required to structure all specific technical assistance and capacity-building actions, and identify legal or regulatory measures to enable the WEs to improve service operation.

Based on this audit/diagnosis, the team of consultants will prepare a handbook of required jobs within the WEs, along with their ToRs, while specifying the minimum requisite skills per position and the standard training needed, and preparing a capacity-building plan, accordingly.

Specific support will then be provided to the WE on specific topics and studies to be carried out, as concluded from the audit report (i.e. pricing strategy, asset management, data collection and management of service monitoring, accountability management, contracting with private operator… etc.).

E.2.6 OPERATION AND MAINTENANCE OF FACILITIES AND SERVICES

E.2.6.1 Challenges

The operation of facilities and services is a key factor for developing the sector and strengthening the sustainability of services.

Three main axes form the basis for the proper and sustainable management of facilities and provision of services:

- The improvement of operating cost control
  Through controlling the energy bill, that is the main burden on the operating cost of facilities, and defining guidelines to ensure that design of facilities is adapted to the capacity to cover operating costs and provide proper maintenance.
- The structuring and enhancement of the private sector involvement
  WEs already have contracts with private operators for facilities' operation but lack an efficient and effective contracting framework and internal technical skills to properly supervise private operators. One of the priority actions of this strategy is to review existing contracts with private operators and develop a new contracting framework that could include performance-based contracts.
- The adoption of a shared wastewater management framework
  This is a challenge on its own and a high priority for the sector's sustainability. All main stakeholders agree on the institutional framework based on the responsibility of WEs for managing wastewater systems. However, the effective framework for wastewater management is not clear and needs to be refined. Several actors may be involved in wastewater management (WEs, municipalities and private operators), but the process of identifying modalities of involvement and the appropriate financing method still need to be defined.

E.2.6.2 Actions to undertake

Improving operating cost control

1. Develop a specific strategy to control the energy costs of the facilities

   A study is currently being carried out to identify alternative techniques to ensure that the facilities have access to more sustainable and affordable energy sources.

   Dedicated experts will be appointed to review all available studies, identify gaps and prepare terms of references for any required complementary diagnosis.

Based on this study, experts will support the MoEW and the WEs in preparing strategic guidelines on controlling energy costs.

2. Define guidelines to ensure that the design of facilities is adapted to the capacity to cover operating costs and provide proper maintenance.

   Specific experts (specialized in water and wastewater facilities operation and water accountability) will assess O&M costs of operating facilities (for water production/distribution and wastewater treatment), benchmark O&M costs of main technologies and produce a guide on the various processes and associated operating costs.

   Based on the results of this assessment and the evaluation of the WEs' technical and financial capacities (activity 2.4.2), experts will propose guidelines to the MoEW on aligning facilities design to the WE's technical and financial O&M capacities. These guidelines will be part of the coordination tools between the MoEW, CDR and the WE.

Enhancing private sector involvement

1. Reviewing existing contracts with private operators and developing a new contracting framework and performance-based contracts

   The first step will include an assessment of existing contracts signed by the WE with private operators for facilities management, identify gaps and limits and propose improvements to the contracts framework which will introduce performance supervision.

   Part of this first assessment will be to identify the gap in the WE's internal skills for performance-based contract management and define the required action (training, recruitment of specialized staff, specific support through TA… etc.). This will be done through the first audit of the WE with specific requirements or complementary assessment, if needed.

   This work should allow for a new framework for establishing contracts with private operators, to be implemented in a short timeframe.

   After the first period of implementation, the MoEW will recruit experts to evaluate the efficiency and ownership of this framework by the WE. Experts will propose any required improvement. This process should lead to the development of a proper framework, in the long-term, for contracting and supervising private operators for the operation and maintenance of facilities.

2. Identifying the activities to be outsourced and the subcontracting arrangements to be adopted

   The WE audit provided by experts recruited for activity 2.4.2 will allow to identify the tasks or activities that are well-managed internally, and the ones that could be more efficiently outsourced.

   Based on this diagnosis, an adapted framework for outsourcing will be proposed for each WE.

   Specific "proof of concept" pilots could be implemented to benefit from the private sector experience in operating specific tasks of the service.

3. Defining guidelines and a framework for private sector engagement

Private sector engagement is a mid to long-term target that requires a certain degree of maturity of the water sector. All activities implemented in the short-term should improve the sector's stability and reliability and create an enabled environment for private actors' participation in the water sector.

Midway through the strategy implementation, a specific assessment should allow to measure the progress and maturity of the sector, based on which a specific framework for private sector participation shall be defined.

4. Expanding the use of the performance-based contracts template when recruiting private operators

   Expansion of performance-based contracts will be implemented through a continuing monitoring-evaluation process that will be based on the following main thresholds:

   In the short-term (by 2025), the current contracting format between WEs and private operators has to be reviewed and long-term performance-based contracts have to be introduced, especially for the wastewater management (the target is 2022 for the operation and maintenance of wastewater facilities). For some WWTP, these contracts could include capital rehabilitation plus a five-year operation period, so the private partner sticks to both CAPEX and OPEX budgets and reaches the discharge service level. It is crucial that WEs receive specific support to develop this new framework and supervise the proper execution of the contracts by private operators. Qualified staff for procurement and technical supervision should be hired in the short-term.

   In the mid-term (by 2030), these contracts will be assessed and eventually reviewed for improvement purposes. Meanwhile, all regulatory and legislative documents will have to be progressively assessed and adapted to ensure the efficiency and sustainability of this contractual framework.

   In the long-term (by 2035), this contract format should become the norm.

Adopting a shared wastewater management framework

A specific study should be carried out to:

- Analyse the current wastewater facilities management arrangements and wastewater financing tools (fee added to the water bill, municipal tax… etc.),
- Conduct a full cycle analysis for each wastewater system currently operational,
- Set benchmarks from successful frameworks used in Lebanon and abroad,
- Coordinate with the WEs, the MoEW, CDR, donors and partners to conduct joint discussions,
- Propose scenarios and an overall framework for wastewater facilities management and propose financial arrangements for O&M (in coordination with the tariff study that will be carried out in the framework of the water metering development).

APPENDIX E.1 PRIORITY AND SHORT TERM ACTION PLAN

PRIORITY AND SHORT-TERM ACTION PLAN — Sheet 1 of 5

Total Estimated Cost of the Action Plan = 12 972 500 USD

Activity	Priority	Stakeholder		Means to mobilize	Deadline	Indicators	Funding	Cost (USD)
		Lead	Involved					
A. Sector Governance								
A.1 Implement the legal and regulatory framework reform (Water Code)								
A.1.1 Prepare, adopt and implement the Water Code bylaws as already listed	High	MoEW	WE, LRA, MoE, MoA	Recruitment of legal consultant	Phase 1 : Q1 2021 Revision : end 2025	Adopted Decrees	INT	40 000
A.1.2 Draft revised WE organisation bylaws, support the approval process and follow up on their enactment	High	MoEW	WE	Recruitment of legal consultant	Phase 1 : end 2020 Revision : end 2025	Adopted Decrees	INT	35 000
							Total A.1	**75 000**
A.2 Rationalise the tutelage framework with a view for clear dispatching between operational and regulatory activities								
A.2.1 Restructure the Ministry's supervisory functions and introduce a substitute function in the event of WE failure (incl. direct procurement of external audit if not conducted by WEs and cost deduction from their budget)		MoEW		Recruitment of legal consultant	End of 2020	Revised Decree	INT	5 000
A.2.2 Review the organisational decrees by focusing them on defining guidelines for WEs organisation and streamline specific procedures	High	MoEW		Recruitment of legal consultant	Phase 1 : end 2020 Revision : end 2025	Adopted Decrees	INT	
a. Define guidelines for the WEs' HR recruitment and organisation structures / simplify the organisation chart validation procedure			WE					*Covered under item A.1.2*
b. Streamline the HR recruitment process and make it possible to enhance recruitment outside the public service procedures			WE					
c. Raise the expenditure and procurement validation thresholds			WE, MoF					
d. Define guidelines for WE performance monitoring			WE					
e. Define guidelines for pricing services and simplify the validation procedure			WE					
f. Define guidelines for procurement management and the management of performance-based contracts			WE					
A.2.3 Conduct an assessment of the administrative supervision department roles and capacities and develop a specific staff capacity-building plan	High	MoEW		Recruitment of consultants / experts (water services management, HR, capacity-building)	Assessment : End of 2020	Assessment and CB plan validated by MoEW and activity reports of the supporting activities	INT	75 000
					Implementing the capacity-building plan : End 2025			300 000
							Total A.2	**380 000**
A.3 Develop proper mechanisms for performance monitoring								
A.3.1 Set up a unit in charge of performance monitoring within the MoEW administrative supervision department	Short Term	MoEW		Recruitment of technical assitants (to 2 Experts in water services management and performance monitoring)	Recruitment : End 2020 TA until end 2025	*Standardized reports prepared by WEs *Conduction of external annual audits starting in 2021 *Production of KPI *Performance contracts between MoEW and WEs	INT	900 000
A.3.2 Standardise the structure of annual reports incl. financial and business reports	Mid Term	MoEW	WE					
A.3.3 Define the monthly activity report submission and validation structure and procedure	High	MoEW	WE					
A.3.4 Develop the framework for the annual external audit and evaluation of WE	High	MoEW	WE					
A.3.5 Define key performance indicators to be monitored in the short, medium and long term (in alignment with the WE monitoring capacities)	High	MoEW	WE					
A.3.6 Establish performance contracts between the MoEW and WE	High	MoEW	WE					
A.3.7 Set up the performance monitoring committee as required by law 221	High	MoEW	WE, MoF					
							Total A.3	**900 000**

Total A. Sector Governance : 1 355 000 USD

PRIORITY AND SHORT-TERM ACTION PLAN — Sheet 2 of 5

Total Estimated Cost of the Action Plan = 12 972 500 USD

Activity	Priority	Stakeholder		Means to mobilize	Deadline	Indicators	Funding	Cost (USD)
		Lead	Involved					
B. Financial and commercial								
B.1 Conduct a customer and user census								
B.1.1 Identify customers connected to piped water and convert unknown customers tapping into the network into legal users	High	WE	MoEW	Recruitment of consultants (technical experts and census experts) - Census to be conducted for all customers / estimated to 1 500 000 of households (price: $3 for 1 household)	Phase 1 : End 2020 Complete census : Beginning 2021	Census reports and updated WEs' consumers database	INT	4 500 000
B.1.2 Identify users of collective wastewater services (network or network+WWTP) / identify those who are / are not WE customers (cross-reference with the water supply customer census) in order to define specific approaches for tariff-setting	High	WE	MoEW	Recruitment of consultants (technical experts and census experts)	Complete census for zone 1 by mid 2021	Census reports and updated WEs' wastewater services users database	INT	2 000 000
B.1.3 Ensure the take over of new customers/users by WEs and their inclusion in the customer/users database for the billing/collection cycle		WE	MoEW	if needed support from specific TA	Beginning 2022	Increasing subscribers base	INT	*No Cost*
							Total B.1	**6 500 000**
B.2 Implement consumption-based tariffs for water service								
B.2.1 Streamline the water meter billing procedure		MoEW		Recruitment of financial and water tariff expert(s)	Mid 2022	Harmonized guidelines and procedures for water meter billing	INT	50 000
							Total B.2	**50 000**
B.3 Revise the tariff structure for sanitation services								
B.3.1 Conduct a proper cost analysis of facilities O&M		MoEW		Recruitment of technical and financial experts on wastewater management	End 2020	Adoption and implementation of new tariff policy for wastewater management	INT	200 000
B.3.2 Base the tariff on the cost analysis and, as a minimum, cover O&M costs		WEs			Mid 2021			
							Total B.3	**200 000**

Total B. Financial and commercial : 6 750 000 USD

PRIORITY AND SHORT-TERM ACTION PLAN — Sheet 3 of 5

Total Estimated Cost of the Action Plan = 12 972 500 USD

Activity	Priority	Stakeholder		Means to mobilize	Deadline	Indicators	Funding	Cost (USD)
		Lead	Involved					
C. Reporting and monitoring								
C.1 Enhance sector monitoring								
C.1.1 Create a Monitoring Department within the Ministry		MoEW		Recruitment of legal consultant	End of 2020	Revised Decree or Amendment to the Law 247	INT	7 500
C.1.2 Establish a unified database to include all sector monitoring data and ensure it is regularly updated (incl. the WE KPI)		MoEW		Recruitment of water sector monitoring (part-time assistance) and 1 IT expert (full-time assistance)	Mid 2021 Mid 2022	*TA recruitment *TA activity reports *Establishment and regular update of the sector database Database	INT	750 000
C.1.3 Set up an annual sector review involving the main stakeholders and partners		MoEW		Organisation of annual sector workshop	Mid 2020	Workshop / annual review and annual sector review report	National	*No Cost*
C.1.4 Set up the process for monitoring the Strategy implementation status		MoEW		Analysis of sector data	Mid 2025	Strategy implementation status report	National	*No Cost*
							Total C.1	**757 500**
C.2 Enhance sector transparency								
C.2.1 Ensure a transparent flow of information between WEs and MoEW through regular reporting (annual report, financial report, business report)		MoEW		Reports production and publication / TA support	Continuous activity	Meeting minutes, reports	National	*No Cost*
C.2.2 Publish annual WE reports (incl. results of audits performed by independent auditors)		WEs		Recruitment of external auditors	starting from mid 2021	Annual WEs' reports publication	National	*No Cost*
C.2.3 Prepare financial reports based on IFRS book-keeping standards		WEs		Reports preparation with TA support if needed	starting from mid 2021	Financial report	National and INT TA	*No Cost*
C.2.4 Publish the main sector indicators, ensuring these are updated on a regular basis		MoEW		Update of sector indicators (with TA - see C.1.1)	starting from mid 2021	Publication of main sector indicators	National and INT	*No Cost*
C.2.5 Publish the breakdown of the water bill		WEs		Publication and communication support	starting from mid 2021	Publication by each WE of the water bill breakdown	National	*No Cost*
							Total C.2	**-**
C.3 Enhance sector coordination								
C.3.1 Improve coordination between CDR and WEs on infrastructure project planning and management		MoEW		Regular meetings, MoEW follow-up on coordination, support from donors and sector partners	Continuous activity	Participation of WEs in the projects design and implementation	National	*No Cost*
C.3.2 Organise an annual sector review involving all stakeholders and partners		MoEW		Organisation of annual sector workshop	Mid 2020	Workshop / annual review and annual sector review report	National	*No Cost*
							Total C.3	**-**
C.4 Enhance communication with user								
C.4.1 Develop a communication strategy for MoEW and WE		MoEW		Recruitment of communication experts	End 2020	Communication strategy, tools and supports	International	500 000
C.4.2 Design and launch a national communication campaign on the water		MoEW			Beginning 2021			
							Total C.4	**500 000**

Total C. Reporting and monitoring : 1 257 500 USD

PRIORITY AND SHORT-TERM ACTION PLAN — Sheet 4 of 5

Total Estimated Cost of the Action Plan = 12 972 500 USD

Activity	Priority	Stakeholder		Means to mobilize	Deadline	Indicators	Funding	Cost (USD)
		Lead	Involved					
D. Capacity-building								
D.1 Strengthen the MoEW monitoring capacities								
D.1.1 Appoint specific technical assistance to the MoEW to help develop monitoring		MoEW		***Covered under item C.1.1***				
D.1.2 Support the MoEW in defining sector key performance indicators		MoEW						
D.1.3 Support the MoEW and the WEs in developing a performance		MoEW		***Covered under item A3***				
D.1.4 Identify the MoEW staff to be trained and supported in monitoring		MoEW						
							Total D.1	-
D.2 Streamline and structure WE internal organisation and management								
D.2.1 Conduct an overall internal audit in each WE (organisational, HR management, financial - assets, commercial, technical), propose measures and guidelines for streamlining internal WE organisation		WEs		Recruitment of the following experts: institutional, O&M of water utilities, capacity-building and HR management, water and wastewater	Beginning 2021	Audit report validated by MoEW and the four WEs	INT	450 000
D.2.2 Prepare a handbook of jobs in the WEs with minimum skills required per position and standard training / capacity-building plan to be implemented		WEs			*Beginning of 2022 for the hanbook validation *End of 2025 for implementing the capacity-building plan and TA support	*Handbook *Capacity-building plan *TA activity reports and specific studies	INT	2 500 000
							Total D.2	**2 950 000**

Total D. Capacity-building : 2 950 000 USD

PRIORITY AND SHORT-TERM ACTION PLAN — Sheet 5 of 5

Total Estimated Cost of the Action Plan = 12 972 500 USD

Activity	Priority	Stakeholder		Means to mobilize	Deadline	Indicators	Funding	Cost (USD)
		Lead	Involved					
E. O&M of facilities and services								
E.1 Improve operating cost control								
E.1.1 Develop a specific strategy to control the energy costs of the facilities (based on ongoing studies)		MoEW		Recruitment of technical and financial experts	End of 2021	Validated reports and strategic guidelines	INT	150 000
E.1.2 Define guidelines to ensure that facilities design is adapted to the capacity to cover their operating costs		MoEW		Recruitment of technical and financial experts (coordinate with other financial and technical studies)	End of 2021	Publication of guidelines	INT	100 000
							Total E.1	**250 000**
E.2 Enhance private sector involvement								
E.2.1 Review existing contracts with private operators and develop a new contracting framework and performance-based contracts		WEs		Recruitment of institutional, legal and technical experts in overseeing water facilities O&M contracts	Mid 2021 for pilot contract for wastewater facilities management End of 2025 to assess the contracts and revise the framework (if needed)	Implementation of performance-based contracts Assessment report of the efficiency and ownership by WEs of this framework and propose improvements	INT	160 000
E.2.2 Identify the tasks or activities to be outsourced and the outsourcing arrangements to be adopted		WEs		Recruitment of the following experts: institutional, O&M of water utilities, capacity-building and HR management, water and wastewater	Mid 2021	Reports and validation of the proposed framework by WEs and MoEW	INT	*No Cost*
							Total E.2	**160 000**
E.3 Adopt a shared wastewater management framework								
E.3.1 Address the issue of the organization(s) responsible for managing the WW network and treatment plants (WEs, municipalities, private operators.) and determine the financing method		MoEW		Recruitment of institutional, financial and technical experts in wastewater facilities operation and management	Mid 2021	Publication of the wastewater management framework	INT	250 000
							Total E.3	**250 000**

Total : 660 000 USD