Public- Public partnership

Water and Wastewater management

Objective: Develop a Framework Agreement template between RWEs and municipalities.

- What are the current practices regarding the management of the water sector?
- What are the issues of the current practices?
- Who are the best parties to manage and operate the water/wastewater sector or what is the efficient mechanism between parties to manage and operate the water sector?

Research methodology

Legal review

Interviews with small and big municipalities from the four regions

Interviews with the union of municipalities

Interviews with the RWEs

Interviews with the MoEW representatives

***Case studies**: Deir Qanoun En Nahr, Qmatieh, Al Ain.*

The guiding questions are divided into 5 sections:

- The profile of the town/ village,
- The current situation of the water sector,
- The current situation of the wastewater sector,
- The financial resources and implemented projects, and
- The communication, relationship with the RWEs and suggestions.

Research limitations

- Qualitative data
- The time factor and the circumstances that Lebanon is going through from the economic crisis and the restrictions imposed in light of the election was another factor that affected the data collection phase.
- The bureaucratic process while trying to meet stakeholders and public authorities especially the water establishments was the main obstacle in this study. Noting that some appointments took more than two months to be take.
- The cancellation of interviews on the spot or one hour before is also one of the challenges that hindered the data collection phase.

- Contradictions of some data

القوانين التي ترعى مرفقي المياه والصرف الصحي في لبنان:

1. قانون رقم 221 الصادر بتاريخ 29 أيار 2000 (قانون تنظيم قطاع المياه)

2. القانون رقم 77 الصادر تاريخ 13/4/2018 (ألغي هذا القانون بموجب القانون 192/2020)

3. القانون رقم 192 الصادر بتاريخ 16 تشرين الأول سنة 2020 (قانون المياه)

Water sources: Ownership and management

Water provision is usually done by the RWEs employees based on the schedule of the RWEs, which are in most cases from the locals.

Lack of supervision → favoritism in water provision and the non-compliance to the RWEs schedule.

In some cases, neither RWEs nor municipalities can monitor the process.

Some municipalities are managing water sources and not only the network.

Wells are managed, excavated and prepared by the municipalities, or privately owned then rented and managed by the municipalities.

Wells

26 municipalities have wells within their administrative boundaries
50 Public well
13 private (3 municipalities)

8 municipalities: Water treated
Small number: Water is not potable

Springs

40springs
26 Potable springs
20/40 are tested regularly

التنسيق بين البلديت ومؤسسات المياه حول
مراقبة وفحص المياه بشكل دوري؟

Ownership

When asked about the ownership of the wells it was noteworthy that 10 out of 26 mayors who have water sources in their administrative area stated that their municipalities own the wells, which is not aligned with the law.

In some cases, there are problems between them and the RWEs regarding ownership. (Kfarouman, Haris)

We are the managers of the sector, so we are the owners of the wells.

Private sector - Uncontrolled cartel?

- 2/3 of the targeted towns and their surroundings use private tanks to secure sufficient quantities of water.

- They use wells inside the town or in the surrounding area and sell water to locals.

- Water provided to locals by water tankers is neither monitored nor treated.

- local public authorities are either covering them or unable to control them.

- In some cases, such as in Majdal Selem, and Aitaroun, the municipalities succeeded in managing the sector. They use water tanks to provide water directly from the wells to the locals at the lowest cost, especially to those who are not connected to the network.

- In the towns where the municipalities manage the private tankers, water quality is tested, and the price is considered affordable and fixed

(1 to 1.5USD per cubic meter/ between 2 and 5 USD per cubic meter.

Central tanks

1. At least half of the targeted municipalities stated that the central tanks are mostly managed by the municipalities.

2. Tanks maintenance cost ranges between 300$ and 10000$ annually according to:

- Condition
- Number
- Location of the tanks.

A small number of the tanks work by gravity → high cost of operation. (Constant and permanent pumping is required)

- **Most of the tanks that are completely managed and maintained by the RWEs are in the SLWE and the BMLWE regions.**

Water network

- % of network coverage is not the same in all regions. Household connections to the water system at the national level are estimated to be around 79%.

- >70% in the BMLWE region, the highest among the four areas in Lebanon.

- SLWE stated that they cover the whole area except some villages/towns (around 15 towns).

- The scope of work of the NLWE covers around 2000 Km². Only 57% of this area is really covered by the NLWE, as the rest are not equipped with the necessary infrastructure.

- BWE manages the sector in the whole region except in several towns (around 75 towns) where the municipalities refused to hand over the sector to the BWE Interviews with the RWEs representatives.

Unequal distribution: the topography of the areas, the old situation of the network in addition to the infringements.

"إذا قمنا بتسليم قطاع المياه سيصيبح حالنا كما البلدات المجاورة"

"There are flow meters in the village but they are not functional because of political interference."

Water network

1. Maintenance processes are not similar in all the towns and villages all over the regions

The capacity of:

- Each municipality
- Each water establishment

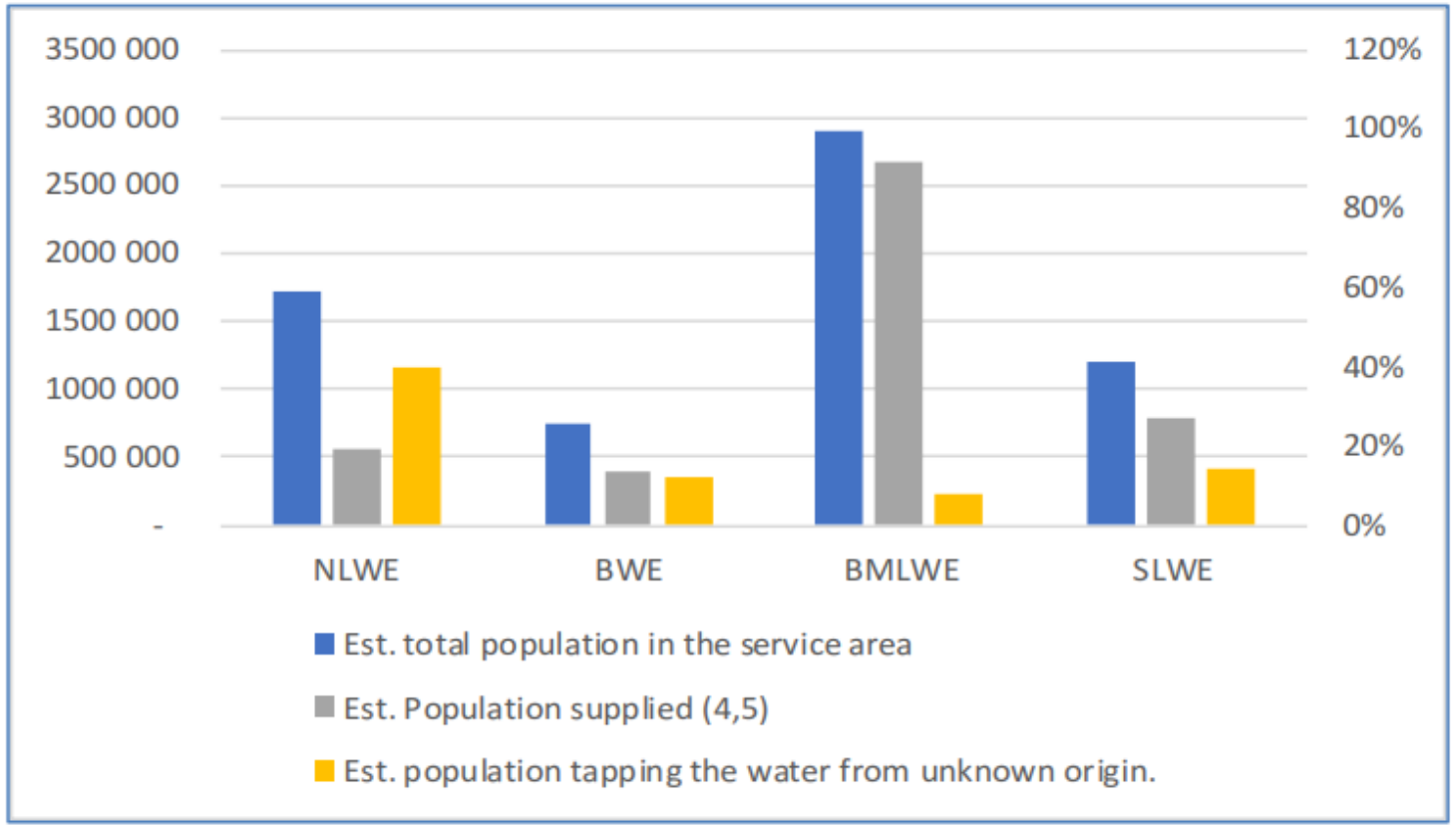
The availability of:

- Human resources
- Financial resources
- Water sources
- Context of the town.

Usually, the municipalities help in performing maintenance for the network, providing fuel and completing the work that should have been done by other entities such as the ministry of transportation and public works.

In the cases where the municipalities are involved in the maintenance and the operation process and due to the limited resources, municipalities get donations from either INGOs or individual private donations. This situation increases political patronage and administrative corruption and is not considered sustainable

Trust with the municipalities?



Population supplied vs overall population

The currently collected amounts of billed water in the RWEs are well below satisfactory to cover their expenditures.

Many users do not pay the annual tariff but still have access to water illegitimately.

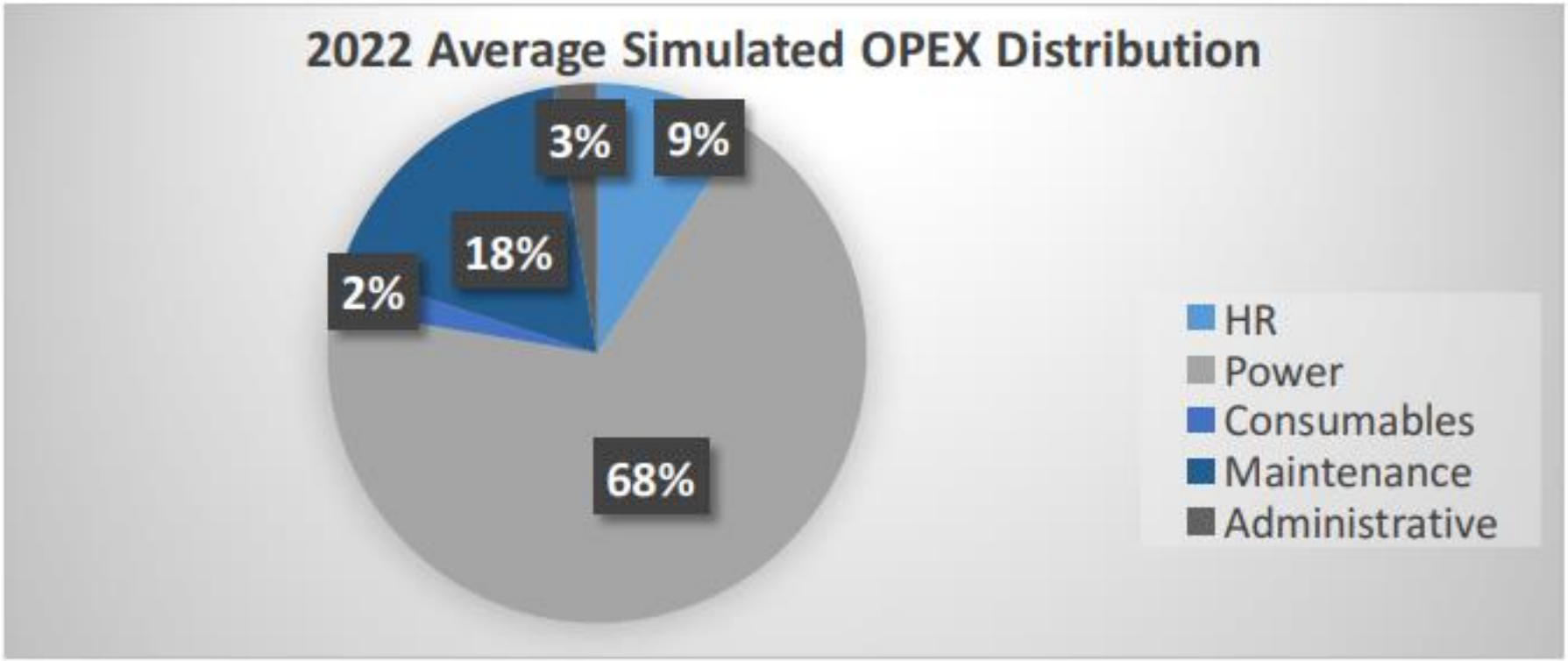
Similarly, the number of subscribers to the water services with respect to the resident population is low in the four RWEs, especially in the North and the Bekaa. Family members share the same subscription, which affects the income of the fees and the quantity of water provided.

While it reaches around 70% in the BMLWE it does not exceed the 22% in the NLWE. Noting that the difference in the collection rate is also inside the same region and between the different towns. where in some municipalities the percentage reaches 80%, it does not exceed 10% in others. (2022)

When the SLWE used to turn off water provision in some towns the municipality supported the offender locals. The mayor justified this behavior by stating that the economic status of the residents is not good enough to afford the fees. Thus, the context in some areas makes the cooperation between both entities and the delegation of some tasks to the municipalities challenging and inefficient.

	NLWE	BMLWE	SLWE	BWE
Collection rate (2019)	51 %	69 %	54 %	46 %
Subscription rate (2019)	50%	60%	60%	37%

Collection and subscription rates per water establishments in 2019
Source: Recovery plan



Average Distribution of Operational Expenditures in the 4 Regional Water Establishments

Municipalities- Financial resources

- The IMF, 60% of the amount is determined based on the number of the registered people and not the residents, thus many municipalities suffer from the lack of financial resources according to the number of residents and the services needed, which affects their efficiency.
- The fees collected by the government on behalf of the municipalities.
- The fees collected directly from the residents. It is to note that the rate of the collection ranges from 0% in some towns to more than 70% in other municipalities. Several factors affect the rate of collection in these municipalities: the family relationship, the availability of mechanisms of collection, and the degree of effectiveness of the municipalities…
- Donations, aids and fines; This is mainly related to the accessibility of municipalities to donors; (INGOs, stakeholders, political parties…) which contribute to the difference of the capacity among the municipalities.
- Municipal revenues from properties and assets.

The above-mentioned criteria reflect the difference in the capacities among the different municipalities, thus the importance of taking the capacity of each municipality when thinking of any kind of cooperation.

lack of financial resources

- Lack of financial resources synchronized with the increase of responsibilities after the approximate collapse of the RWEs.
- The municipalities rely on the local actors, stakeholders, political affiliation, and donors.

- In some areas, a social system was adopted by some municipalities - mainly in the rural/ peripheral areas- to ensure water provision.
- A committee
- In other cases the municipality cooperated with some locals and bought a private source of water to be able to ensure water for the town.

- Some municipalities have more access to donations and funds than the RWES.

The reliance on donations and diaspora support is one of the ways that RWEs and municipalities are able to ensure water provision. It is considered a temporary alternative solution to sustain the sector.

Some technical challenges

Most of the water sources in Lebanon are not monitored for water volumes and production capacities.
No district metering or consumption metering are applied

- The lack of central water storage tanks requires constant pumping and constant power availability.
- The networks do not cover the built units 100%, thus the private sector is very active in some towns.
- The absence of functional flow meters in addition to the infringements and the geographical factor causes unfair distribution and dispute between locals.
- The age of the networks, in addition to the type of pipes, are the two main factors that affect the maintenance cost and the quantity of water provided.
- Pressure on the infrastructure due to urban expansion.

Communication &coordination

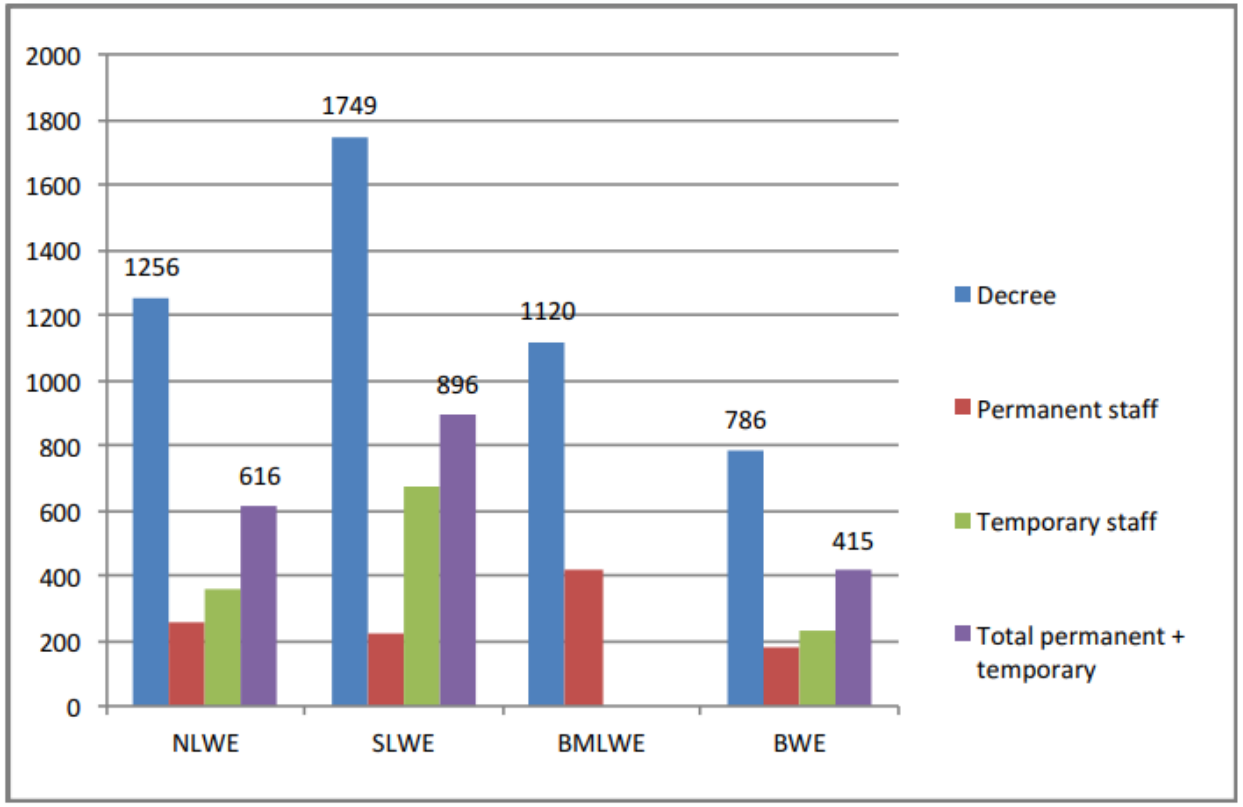
Mayors call the RWEs and ask for help:

- Effective?
- Favoritism?
- Inequity in services provision?
- Monitored?

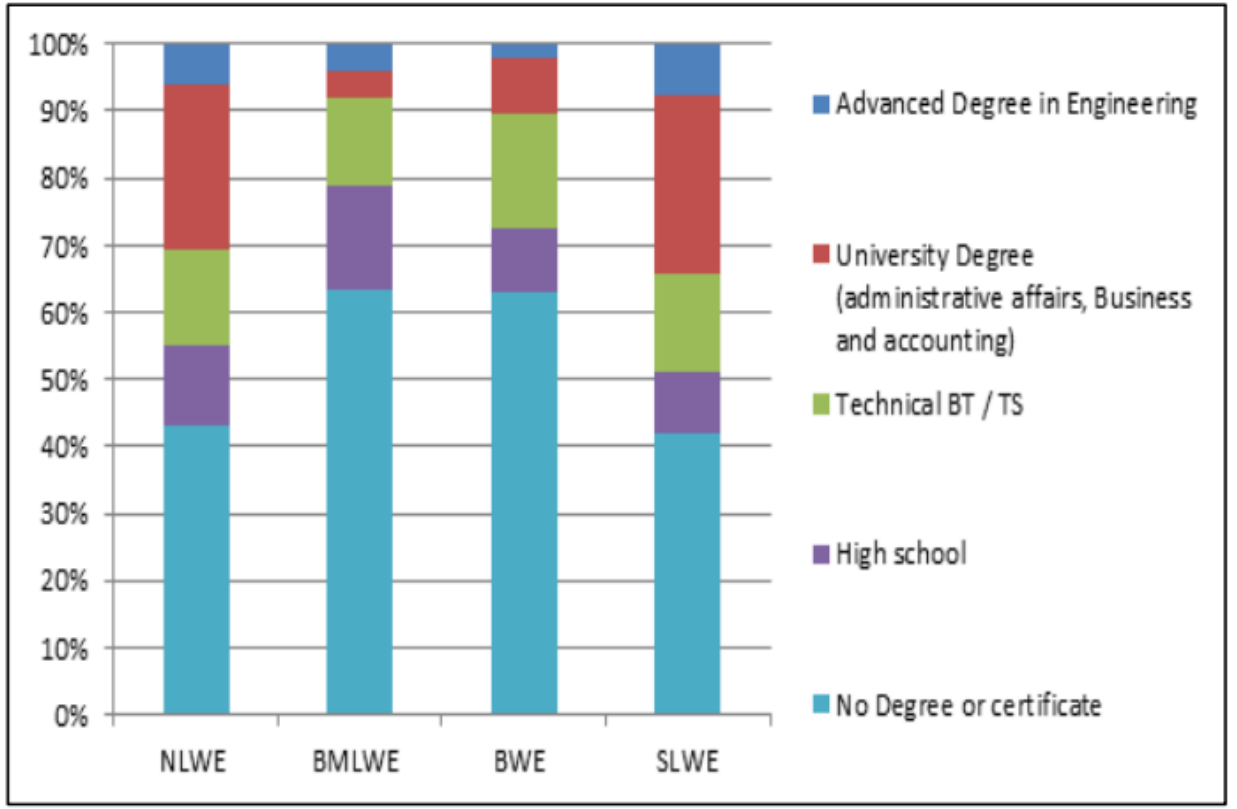
The aim of some calls was to get permission to manage the sector and perform some works, thus this example can be considered as an informal agreement between the municipality and the RWE.

Human resources- RWEs

Lack of expertise?



Staffing status of the four RWEs
Source: NWSS, 2020



Overview of the staff qualifications in the four RWEs
Source: NWSS, 2020

Economic crisis
Employment process
Structure of the RWEs:
Irrigation, wastewater,

Municipalities?

Same employees?

Transportation cost: 94 000 L.L

HawkaMaa - EU
حوكماء - الإتحاد الأوروبي

Funded by the European Union
بتمويل من الاتحاد الأوروبي

Deir Kanoun En Nahr

Deir Qanoun En nahr - South Lebanon - Union of Tyr Municipalities.
Population: 9000 + 1000 Syrian residents, 1050 built units.

The municipality had to deal with urgent challenges in three major sectors: water, electricity and waste management.

The wells and water towers including all equipment were established by the municipalities with financial contribution of INGOs and village inhabitants.

water is tested regularly by the municipality in the laboratories of the Chamber of Commerce, Industry & Agriculture in Sidon & South Lebanon.

Water from South Lebanon Water Establishment (SLWE) sourced from the town of Yanouh

Three functioning boreholes/wells (400 – 450 meters deep) publicly owned by SLWE.

Three main springs in the village that are used exclusively for agriculture

Each well has its own generator, pump and water tower supplying a section of the network.

Water towers (volumes: 250– 500 m^3) have proper spatial distribution in terms of elevation and area.

Water is transported from the tanks to the network by gravity.

Deir Kanoun En Nahr

Water network covers almost the whole village.

Water is transported to the water network by gravity with no cost.

Pumps were provided by SLWE and the municipality.

It costs around 12,000 USD /month for fuel to operate the generators.

The municipality had collected 200,000 USD in donations from expatriates and local village inhabitants to install solar energy stations for two wells.

The cost was greatly reduced to around 8,000 USD/month

The municipality performs 70% of the required maintenance and repair. People don't harvest rain or snow water in the village.

- Each family will have to pay about 166 USD/month for supply by water tankers.

Deir Kanoun En Nahr

An internal wastewater network was established by a fund from International Bank and operated by gravity.

The municipality, in coordination with CDR and the ministry of energy and water executed two projects, each of a cost of almost 300,000 USD and conducted 80% of the village to a wastewater network.

The existing network has saved the cost of collecting wastewater from the houses. The wastewater network needs maintenance which costs about 15,000 USD/year.

The destination of wastewater is the sea. There is a treatment plant (Shawakir) but it is not operated.

Human resources in the municipality are qualified to operate the pumps and generators but not to maintain them or to expand the water or wastewater network.

Deir Kanoun En Nahr

- As most municipalities, DKNM is financially and technically managing the water system in the village.
- Unfair diversions of water
- SLWE input is limited
- DKNM approach towards water management is donation-dependent and not sustainable
- DKNM is interested in collecting a water related fee
- DKNM lack the knowhow and practice on properly managing water networks including proper water monitoring and treatment
- Investments has been made into projects at the village level; although the village is part of a mega water management project that can solve the water issue in the region
- Surface water is not enough for the village requirements
- Groundwater resources are not properly monitored
- Wastewater network is established, has high cost of maintenance, the wastewater is not treated

Qmatieh

Qomatieh- Mount of Lebanon – No union
Population: 10000 +500 Syrian residents, 2000 built units.

Only **250 households** in the Qmatiyeh are connected to BMLWE's network and source their water from the Barouk area which is available only once a month mostly due to fuel shortages. The **1,400 remaining households** are subscribed to the water services of the town's water committee.

The water committee sources its water from wells and springs which are privately owned and/or donated by the members of the committee itself.

The owners don't charge any land rental fees or water costs.

Between November and March, the water committee exclusively sources its water from a spring "Al Ain", which is supplemented by the wells during the summer. The spring is in a nearby town: "Ain el Remmaneh"; however, the land is privately owned by members of the water committee in Qmatiyeh. The water committee has written permission from Ain el Remmaneh municipality for the use of water resources from the spring on behalf of Qmatiyeh inhabitants.

Qmatieh

A distribution schedule among different districts in the town, the schedule differs between summer (once a week) and other seasons (once every two days).

About 20 private water tankers are active in the town and the surrounding area; they source their water from springs surrounding the village.

The tankers are not licensed, and they neither treat nor test the supplied water.

Few years ago, the local manager of BMLWE in Aley office requested an inventory for all the expenses endured by the water committee to be reimbursed as a step for the complete handover of water infrastructure to BMLWE. The committee valuated the water infrastructure expenses along with the land on which the wells and springs exist at around 1M USD

Qomatieh

Several water towers/central tanks

Most of them are built on private land and by donations from landowners and Unicef:

The water towers/ central tanks are in excellent condition.

The water committee pays the municipality a fee for the water tank rental.

The municipalities pay around:

5,000 USD/year for the maintenance of wells.

80,000 USD/year for fuel costs.

2,500 USD/year for network maintenance.

These costs are covered by donation and the water subscription fee which was 20.000 LBP/ month until the end of September 2022 and was raised to 150,000 LBP/month afterwards.

Qmatieh

Findings:

Qmatiyeh is a town whose water system is operated by its residents with a monthly subscription fee to ensure sustainability

BMLWE couldn’t take over the water infrastructure due to the high private investment made the donors

The town was able to form alliances with nearby towns for the fair distribution of water

The water is regularly tested, treated, and disinfected before being pumped through the network

Close family ties in the town played a major role in ensuring that the public benefit is maintained

Lack of political and government intervention played a positive role in the development of water management system

The presence of spring/surface water saves water pumping costs on the town

Conclusion and recommendations

The recovery of the water and wastewater sectors in Lebanon relies on different axes:

- Legal and institutional reform
- Management process
- Cost optimization revenue

Legal and institutional reform

- Drafting the executive degrees and bylaws of the water law 192/2020 to enact the reforms and remove ambiguities according to the identified priorities in a way where responsibilities are clearly defined and towards the concept of collective effort.
- Municipalities should be more involved taking into consideration the financial resources needed, the bureaucracy and the partnership mechanism at several levels.
- Any amendment should improve coordination through binding institutional mechanisms for investment planning and execution to overcome the fragmentation of responsibilities among different entities
- Institutionalization of the relationship between the main and direct stakeholders must be implemented as it is the efficient way in order to manage the water and wastewater sectors in a sustainable way.
- A public-public partnership model between municipalities and RWEs should be adopted when possible, and customized on a case-by-case basis with clear distribution of roles and responsibilities for both water and wastewater systems at financial and technical levels

- **RWEs structure**

- Rework with the **CSC system**. The RWEs can be involved and have a percentage of autonomy in the employment process under the system of CSC

- The water establishment “daily workers” could be at the same time playing **double roles** at the municipal/unions level and under the supervision of the RWEs

- Capacity building is needed in all topics for both entities but mainly for Municipalities.

II- Management process: Water sources and provision

All water resources, whether centralized or municipal-based, should be owned and managed by the RWEs on the basis that water is a strategic national resource and thus should be sold to the municipalities by RWEs.

(*the availability of the water sources inside the municipal administrative boundary is a factor that should be taken into consideration when trying to implement any sort of cooperation between the municipalities and the RWEs.)*

RWEs	Municipalities/UoM
Monitoring water quantity and the resources used for its extraction, Own all the extraction equipment including pumps, boreholes, electrical generators, solar power plants and water networks. When applicable, all the aforementioned items should be placed in the custody of the municipalities based on records of receipt and delivery and traceable inventories with serial numbers and photographic reporting.	Authority and responsibility to distribute water among the subscribers to the water service according to the schedule of the RWEs. (Reduce the cost related to human resources and transportation needed)

II- Management process: Control and monitoring

A special committee in the MoEW shall solve any disputes between the RWEs and Municipalities.

RWEs	Municipalities/UoM
Water infrastructure should be centrally managed, controlled and monitored to funnel all aid and development efforts into the proper destination and prevent redundancy. using smart sensors and valves connected to a central management unit. Provide approval on the quantities used based on predetermined values developed by RWEs experts and consultants,	Municipalities/UoMs submit monthly reports on all the metering points shown in the figure below, indicating the quantity of water, fuel and electricity used in addition to all costs endured for network repair. (Such data should be publicly available and accessible.) Fine infringements all based on flow meters installed at the end-user peripherals, such flowmeters in combination with the meters installed on the main water supply will indicate the presence of leaks or any illegal water hauling and infringements via a water balance operation.

II- Management process: Quality control

Inability of some municipalities to conduct water testing.

Contradiction in the information related to water testing.

Private sources?

RWEs	Municipalities/UoM
Responsible of the water quality control (responsible of water sources)	Municipalities can take this responsibility in case: they have the expertise, or in case they are managed private sources. Private sources should be monitored and tested regularly at the owner expense under the supervision of the municipalities with regular reporting to the RWEs.

A clear mechanism should be set regarding water quality control.

Laboratories (approved by the MoEW)

A common platform should be created to share the results of water quality tests.

II- Management process: Maintenance

"Best-case vs applicable" scenarios.

In the best-case scenario and since it is noticed that most of the on-field water management is taken as the municipality's responsibility, maintenance should be conducted in full by municipalities under the supervision and technical assistance of the RWEs. Such a role should be applicable to all Municipalities that have local water resources while RWEs should be responsible for all central water sources, treatment plants, pumping stations and main pipes till the point where they reach the municipality's borders.

RWEs	Municipalities/UoM
Major repairs: maintenance of mains supplying villages, submersible water pumps, water treatment stations, transformers, electrical control panels and wastewater treatment stations.	Minor repairs: works on the peripheral water and wastewater network in terms of plumbing and civil works, electrical generators supplying the submersible pumps with electricity, preventive maintenance of water towers (insulation, paint, plumbing).

repairs should be divided into two categories: major done by RWEs and minor done by municipalities/UoMs.

II- Management process: Wastewater system

As for the wastewater sector, the water establishments are legally responsible for it, but there is an implicit agreement between the RWEs and the municipalities in some areas such as Bekaa and the North, which considers the wastewater treatment under the RWEs and the network management under the municipalities.

RWEs	Municipalities/UoM
Wastewater networks should be under the management and supervision of the municipalities. RWEs shall charge each village a wastewater fee based on two factors, the number of residents determining the total organic load of the village/town and the quantity of water consumed which should be ultimately divided by the subscribers (taking into consideration Industries, hospitals…) The wastewater treatment plants should be managed by the RWEs in cooperation with the union of municipalities or municipalities when relevant	Wastewater networks should be under the management and supervision of the municipalities

II- Management process: Communication and Coordinatio

Currently, communication between RWEs and municipalities is mostly between the mayor and the representative of the RWE, or directly with the director of the RWE. Such communication rarely takes place through official letters and is mostly through phone calls which lack proper documentation and traceability.

In fact, several areas of the Bekaa are not accessible

In some cases, municipalities report infringements to the water establishments and when the water establishments try to solve the problem, both the residents and the mayor refuse and sometimes exert "power" against the RWEs employees. This is another factor to be taken into consideration when drafting any agreement.

RWEs	Municipalities/UoM
committee handling control and monitoring in the RWEs should have direct communication channels via emails, or any other system that is fast, non-bureaucratic and traceable to solve cases of conflict or inaction.	municipalities should at least follow up on everything in their towns and local committees may be needed. raise awareness about the importance of preserving the equipment and as the municipalities are closer to the locals and they have the ability and the authority to create a volunteering system and to rely on the municipal employees and guards to ensure the security of the sector.

II- Management process: Project execution

It is critical to include all stakeholders in the decision-making process upon executing water related projects while defining the roles and responsibilities of each.

Water and wastewater projects in Lebanon need to include accountability mechanisms and be developed in consultation with local communities to ensure ownership and sustainability

lands ownership

Lack of coordination between the different actors: CDR, RWEs, municipalities, UoM in addition to the lack of planning on a regional level.

- Return on investment (RoI) with specific focus on O&M cost vs. revenues
- Energy sources and energy cost with a detailed analysis of alternatives
- Staff and expertise needed for O&M
- Minimum components where applicable: (Customer database, metering…)

Ministry of Energy and Water, Roadmap to recovery of the water sector in Lebanon, 2022

II- Management process: Collective work

Due to the significant discrepancy in the size of Lebanese towns and municipalities, it could be necessary to conduct town/ municipal twinning between several small towns to reduce redundancy in management and communication.

Kafrouman and Nabatieh Tahta

III- Cost/revenues optimization - Collection

Municipalities and RWEs lack financial resources

Small/ peripheral municipalities also lack human resources

Low rate of fees collection
Low to no control
Provision of network infringements
Clientelism in service provision

Digitalizing the whole process

There are differences in the opinions among the four RWEs regarding the collection fees

Considering that the municipalities can be clients of the RWEs so they buy the quantity needed from the RWEs and sell it to the residents, that the task of fee collection should naturally fall under municipalities responsibility while RWEs should set the monthly fees on village/town basis using a commonly agreed upon formula taking into consideration all factors in addition to the proper and fair operation of wastewater treatment plants.

- Solar power stations for water pumping reduces the cost significantly. However, sustainability of these projects and a plan for the maintenance should be set before implementation.

- Establishment of high-capacity water towers

- Flow-meters

- It should be included in the building code to have water storage tanks of large volumes that are suitable for rainwater harvesting and storage of solar-powered pumped water. The building should also have greywater recycling and use water saving appliances when possible.

- Municipalities should harvest rainwater, when possible, in agricultural ponds to divert the use of domestic water for irrigation purposes.

- Set up a centralized data center and implement data transmission and storage

III- Cost/revenues optimization - Technical measurements for cost optimization

- Prioritizing the rehabilitation of existing infrastructure and the completion of small to medium unfinished systems with high impact on service continuity

- RWEs shall establish a range for water costs per cubic meter and shall develop a plan to lower the cost as much as possible by optimizing the extraction process and reducing the need for costly components and resources: switching to solar powered pumps and phasing out metal-based networks are examples of such measures.

- All metered points shall be reported on a monthly basis by the Municipalities to the RWEs and sent to the MoEW for approval and process optimization including the levels of groundwater when extracting from wells.

- Reduce illegal connections.

A public-public partnership model between municipalities and RWEs should be adopted when possible, and customized on a case-by-case basis with clear distribution of roles and responsibilities for both water and wastewater systems at financial and technical levels.

The responsibilities should be distributed according to the available resources and the context in each case. There are cases where the municipalities can be involved in the sector just at the level of fees collection, in other cases where the municipalities have financial and human resources, they would be more involved in the maintenance process, and the fundraising mechanism.

Moreover, in the cases where the water sources are within the administrative boundary the municipalities may have roles in water provision mechanism under the supervision of the RWEs. This is one of the tools that can be a first step of the development of the road map of the new management system.

Thank you