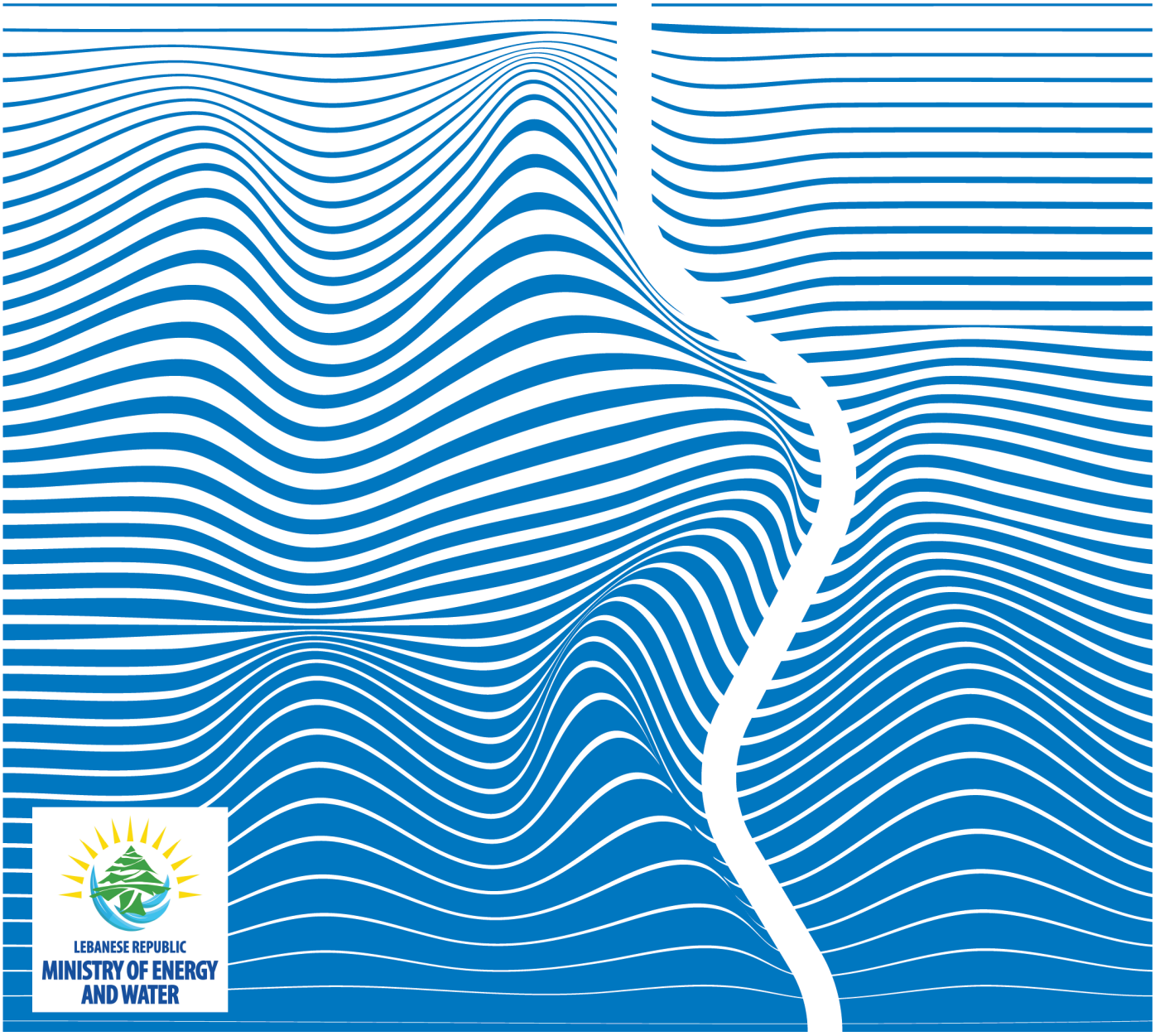
Towards a Sustainable Water Sector

LEBANON'S NATIONAL WATER STRATEGY 2024 - 2035

JUNE 2024



LEBANESE REPUBLIC
MINISTRY OF ENERGY AND WATER

FOREWORD

It gives me great pleasure to present the 2024-2035 National Water Strategy for Lebanon, a reshuffled and condensed version of the 2020 strategy that was partially revised to reflect changes in national and global contexts.

The water sector is currently facing huge challenges including rapid global and local environmental degradation, accelerated climate change, population growth, and shifts in economic sectors. Ensuring the sustainability and growth of the national water sector through a solid strategy is more critical today than ever.

Water plays a pivotal role in Lebanon's future and economic development, making the NWSS rooted in an ambitious and holistic vision aligned with the Sustainable Development Goals and the principles of integrated water resources management. Implementing our vision will require unprecedented efforts in infrastructure development to ensure our country's Water Security, while optimizing existing systems to ensure the highest quality of service to all citizens. A key priority of the NWSS is to innovate and invest in digital monitoring and decision support tools and processes to enhance the water sector's resilience to climate change. Yet, none of this can be attained if we do not build Sustainable water utilities through the implementation of legal, institutional, and financial reforms and improving service management.

Finally, I would like to thank everyone who worked on updating the NWSS, as I am aware that it has been a complex yet satisfying task. This updated version of the strategy is intended to be a living document subject to periodic revisions by the Ministry, which will refer to it for all interventions in the water sector.

With this comprehensive NWSS in hand, I am optimistic that both decision-makers and citizens will frequently consult it and implement plans and projects in alignment with it, to ensure that the sector's ultimate objective, which is "safe and equitable access to services for all Lebanese", can be reached by 2035.

Minister of Energy and Water

Dr. Walid Fayad

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LIST OF ACRONYMS

Bm^3	Billion cubic meter
BMLWE	Beirut and Mount Lebanon Water Establishment
BWE	Beqaa 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
IHIS	Integrated Hydrological Information System
IWMI	International Water Management Institute
l/c/d	Liters per capita per day
l/sec	Liters 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
Mw	Mega watt
NGO	Non-Governmental Organization
NLWE	North Lebanon Water Establishment
NRW	Non-Revenue Water (unaccounted for water)
NWSS	National Water Sector Strategy
SLWE	South Lebanon Water Establishment
UFW	Unaccounted for Water
UN	United Nations
WE	Water Establishment
WEs	Water Establishments

EXECUTIVE SUMMARY

1.1 GENERAL

This national water sector strategy aims to set Lebanon's water sector on a sustainable growth path. It entails practical, transparent and clear initiatives to reform the sector, without which the water sector will continue to underperform hindering the successful operation of existing and new investments.

This strategy builds on the Updated National Water Sector Strategy of 2020, the Water and Wastewater Sector Recovery Plans of 2022 prepared in collaboration with the Agence Française du Developpement (AFD) under the EU funded program, and the National Water Sector Strategy of 2012 approved by the Council of Ministers. This strategy prioritizes institutional and legal reforms and efficient interventions to secure improved services, while targeting the financial sustainability and the mitigation of and adaptation to the Climate Change impacts on the water sector.

The strategy rests on the following 4 main pillars, allowing the sector to reach its ultimate objectives by year 2035:

Pillar 1: Enhanced Water Security

- By 2035, national water storage capacities are increased to 838 million cubic meters.
- By 2035, a data management and monitoring system is fully operational at the Ministry.
- By 2035, compliance with water quality improvement and pollution prevention measures as identified in the Water Act is fully achieved.
- By 2035, proper water allocation allows an increase in available hydropower production capacity from 282 MW to 325 MW.

Pillar 2: Improved Provision of Public Services

- By 2035, 90% of the population has regular and sufficient access to publicly provided water services (currently, drinking water network covers 80% of users with intermittent supply).
- By 2035, 60% of the population's wastewater is collected and treated through publicly managed systems (currently, wastewater network covers 60% of users and only 8% of generated volumes are treated to secondary levels).
- By 2035, irrigation efficiency is increased from 8400 m3/ha/yr to 6,720 m3/ha/yr (that is, from 60% efficiency to 75%), and irrigable lands increased from 100,000 ha to 138,000 ha.

Pillar 3: Sustainable Utilities

- By 2028, operating costs of water and wastewater services are recovered through adjustment of tariff, increased collection (80%) and subscription (75%) and reduced cost of production.
- By 2028, the Water Sector Transformation Program has started financing the transformation of the sector.
- By 2030, 15% of the annual turnover of Water Establishments is mobilized for investment in further development of the service.

- By 2035, Non-Revenue Water (NRW) is reduced by 25 percentage points (from the currently estimated national average of 50%).
- By 2035, cost of energy is reduced by 30% through adoption of energy efficient techniques and sustainable practices, including promoting renewable energy sources in the water sector associated with improved water storage infrastructure.
- By 2035, digital transformation of the Water Establishments has been fully achieved.

Pillar 4: Good Governance and Leadership

- By 2030, sector reforms related to governance, performance management, and monitoring & evaluation are fully implemented at the Ministry of Energy and Water.
- By 2035, digital solutions and advanced technologies for data driven decision making at the Ministry of Energy and Water are fully implemented.

Conditions for the successful implementation of this strategy include the following main factors:

- Adequate human resources to effectively oversee its implementation. This includes skilled personnel capable of managing and executing various aspects of the strategy, from planning to execution to monitoring.
- Technical assistance to support and accompany the Ministry of Energy and Water and the Water Establishments in enhancing their staff capabilities in effectively managing the implementation of the strategy.
- Buy-in and support from the water sector stakeholders and donors through financing the strategy and aligning their interventions with its priorities.
- Political support at both national and local levels to facilitate implementation of policies, regulations, and projects associated with the strategy and garner public support to the initiatives outlined in it.

1.2 STRATEGIC ACTION PLAN

Table 1 National Water Strategy action plan

	Estimated budget up to 2035 (USD)
PILLAR 1 : ENHANCED WATER SECURITY	1,080,000,000
PILLAR 2 : IMPROVED PROVISION OF PUBLIC SERVICES	1,350,000,000
PILLAR 3 : SUSTAINABLE UTILITIES	180,000,000
PILLAR 4 : GOOD GOVERNANCE & LEADERSHIP	10,600,000
	2,620,600,000

(See details herein below)

Table 1 National Water Strategy action plan – Pillar 1 Details

Actions	Target Date	Leading Institution	Estimated Budget (USD)
PILLAR 1 : ENHANCED WATER SECURITY			
1,1 INCREASE NATIONAL STORAGE CAPACITY			
1.1.1 Resume construction of Priority 1 - Batch 1 dams: Bisri, Janneh, Boqaata, Mseilha, and Balaa	2030	MoEW	595 000 000
1.1.2 Secure funds and implement Priority 1 - Batch 2 dams: El Bared, Assi phase I, Azzounieh, and Choumariyeh (Kfarsir)	2035	MoEW	441 000 000
1.1.3 Secure funds and Implement Priority 2 Batch 3 dams: Noura el Tahta, Dar Beechtar, Assi phase 2, Younine, Massa, Ibl el Saqi, Khardaleh, Damour & Maasser el Chouf	*After 2035*	*MoEW*	*1 335 000 000*
1,2 M0NITOR WATER RESOURCES			
1.2.1 Set up a centralized data management and integrated hydrological information system (IHIS) at the Ministry	2030	MoEW	16 000 000
1.2.2 Develop protocols and procedures for the digital transfer of data from meteorological stations, hydrometric stations, and groundwater monitoring stations to the Ministry's data center.	2030	MoEW	
1.2.3 Expand the network of stations, including meteorological, hydrometric, and groundwater monitoring stations, to cover resources across	2035	MoEW	
1,3 IMPROVE WATER QUALITY			
1.3.1 Design and implement a comprehensive surface water, groundwater, and irrigation water quality monitoring framework	2030	MoEW	N/A
1.3.2 Develop and implement pollution prevention measures on water sources and recharge zones	2024-2035	MoEW	N/A
1.3.3 Complete geological and hydrogeological mapping & develop Water Safety Plans nationwide	2035	MoEW + WEs	5 000 000
1,4 DEVELOP A STORMWATER MANAGEMENT PLAN			
1.4.1 Define measures for stormwater management, identify stakeholders' responsibilities and develop a stormwater management plan	2026	MoEW	3 000 000
1,5 ENHANCE NATURAL AQUIFER RECHARGE			
1.5.1 Assess & implement NAR works across major rivers and valleys	2035	MoEW	20 000 000
1,6 ENGAGE IN RESEARCH & INNOVATION			
1.6.1 Set up the Water Resilience innovation and research program	2030	MoEW	N/A
		Pillar 1 Estimated budget up to 2035 :	**1 080 000 000**

Table 1 National Water Strategy action plan – Pillar 2 Details

Actions	Target Date	Leading Institution	Estimated Budget (USD)
PILLAR 2 : IMPROVED PROVISION OF PUBLIC SERVICES			
2.1 DEVELOP PUBLIC WATER SUPPLY SERVICES			
2.1.1 Complete water master plans	2028	MoEW + WEs	1 500 000
2.1.2 Implement priority 1 projects	2028	MoEW + WEs	55 000 000
2.1.3 Implement priority 2 projects	2035	MoEW + WEs	765 000 000
2.1.4 Implement priority 3 projects	*After 2035*	*MoEW + WEs*	*460 000 000*
2.2 DEVELOP PUBLIC WASTEWATER SERVICES			
2.2.1 Complete wastewater master plans	2028	MoEW + WEs	1 000 000
2.2.2 Implement priority 1 projects	2028	MoEW + WEs	65 000 000
2.2.3 Implement priority 2 projects	2035	MoEW + WEs	338 000 000
2.2.4 *Implement priority 3 projects*	*After 2035*	*MoEW + WEs*	*2 000 000 000*
2.3 DEVELOP PUBLIC IRRIGATION SERVICES			
2.3.1 Complete irrigation master plans	2030	MoEW + WEs	1 500 000
2.3.2 Implement priority 1 projects	2028	MoEW + WEs	7 000 000
2.3.3 Implement priority 2 projects	2035	MoEW + WEs	116 000 000
2.3.4 Implement priority 3 projects	*After 2035*	*MoEW + WEs*	*1 637 000 000*
		Pillar 2 Estimated budget up to 2035 :	**1 350 000 000**

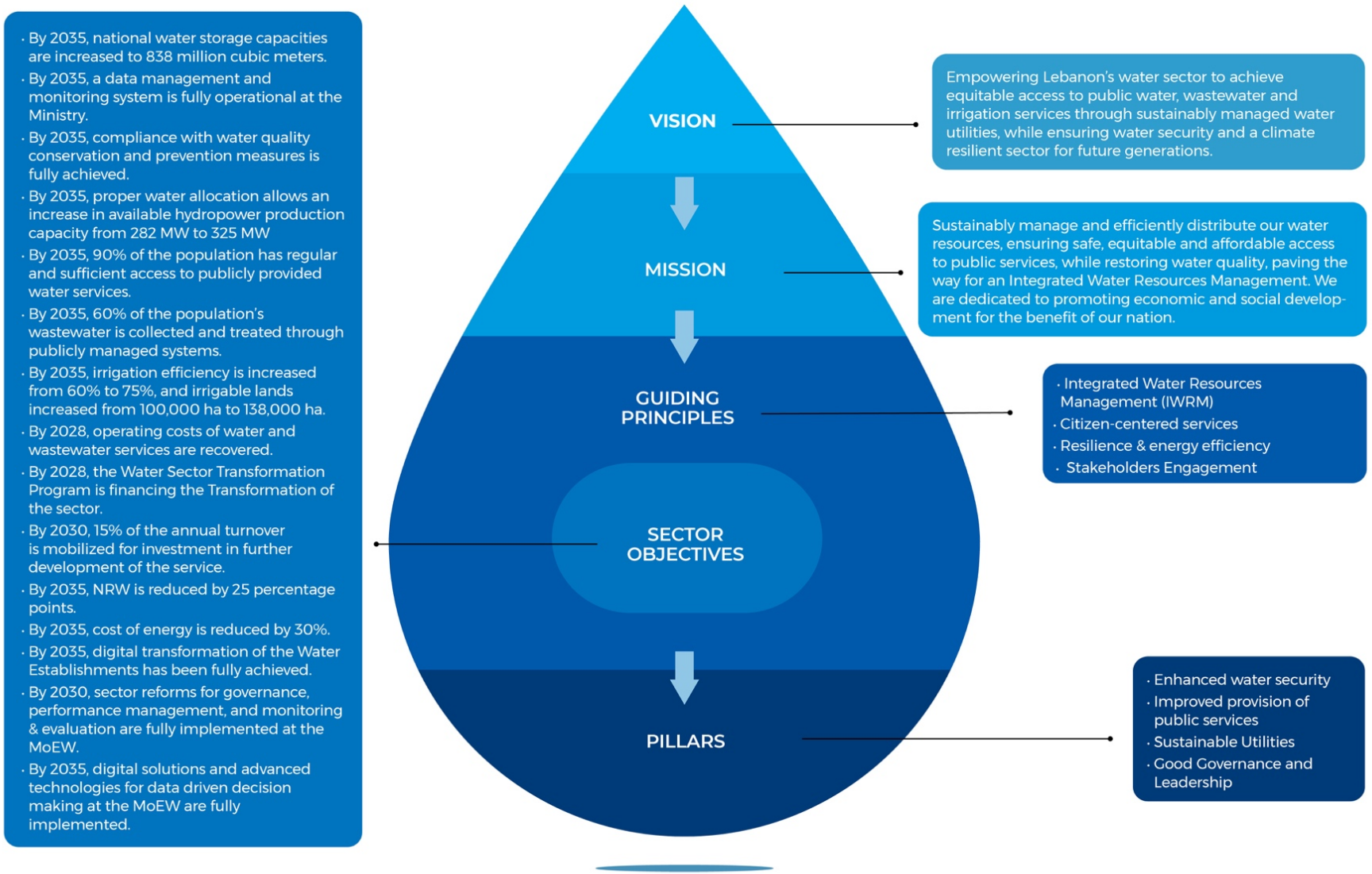
Table 1 National Water Strategy action plan – Pillar 3 Details

Actions	Target Date	Leading Institution	Estimated Budget (USD)
PILLAR 3 : SUSTAINABLE UTILITIES			
3.1 ESTABLISH FULL COST RECOVERY			
3.1.1 Adopt a modernized tariff strategy	2024	WEs	N/A
3.1.2 Conduct a customer census and update customer database	2026	WEs	5,000,000
3.1.3 Source funds & support from donors & Government to bridge cost recovery gap	2024-2028	WEs + MoEW + GoL + Donors	N/A
3.1.4 Increase collection rate to reach 80%	2028	WEs	N/A
3.1.5 Increase subscription rate to reach 75%	2028	WEs	N/A
3.1.6 Develop & implement a NRW strategy & decrease NRW by 25 percentage points	2035	WEs	TBD
3.1.7 Increase the reliance on renewable energy and efficient storage practices to 30%	2035	WEs	TBD
3.2 DEVELOP AUTOMATION, DIGITIZATION & PERFORMANCE MONITORING			
3.2.1 Develop Metering at all levels:		WEs	
- Water production metering 100%	2029	WEs	20,000,000
- Water distribution district metering 40%	2029	WEs	50,000,000
60%	2035	WEs	
- Retail metering at subscribers level 15%	2029	WEs	25,000,000
40%	2035	WEs	
3.2.2 Conduct the Digital Transformation of WEs		WEs	
- Phase 1: Prepare road map for digital transformation	2024	WEs	0
- Phase 2: Implement digitization, including Automation, Scada systems, ERP	2024 2035	WEs	80,000,000
3.2.3 Standardize the structure of WEs' annual reports with KPIs to be monitored	Q1 2024	MoEW + WEs	N/A
3.2.4 Assess and revise performance-based contract with private operators	2030	MoEW + WEs	0
3.2.5 Develop regulatory framework for contracting with public institutions	2024	MoEW + WEs	0
3.3 RESTRUCTURE INTERNAL ORGANISATION OF WATER ESTABLISHMENTS			
3.3.1 Enact revised WE organizational decrees	2024	MoEW + WEs	0
3.3.2 Implement revised WE organizational structures	2025	WEs	N/A
3.3.3 Recruit specialized and qualified technical staff following appropriate legislative and regulatory modifications	2025	MoEW + WEs	N/A
3.3.4 Develop adapted capacity building plans	2025	WEs	N/A
3.4 DEVELOP & IMPLEMENT THE WATER SECTOR TRANSFORMATION PROGRAM			
3.4.1 Prepare and develop guidelines and operational framework	2024	MoEW + donors	N/A
3.4.2 Set-up the water sector transformation Program	2025	MoEW + donors	N/A
3.4.3 Provide necessary support to WEs to develop their 3-year business plans	2025	MoEW + donors	N/A
3.4.4 Adjust funding priorities based on results achieved and KPIs reached	2026-2030	MoEW + WEs+ donors	N/A
3.4.5 Ensure smooth transition to sustainable self-funding models for WEs	*2030-2035*	*MoEW + WEs+ donors*	*N/A*
		Pillar 3 Estimated budget up to 2035 :	**180,000,000**

Table 1 National Water Strategy action plan – Pillar 4 Details

Actions	Target Date	Leading Institution	Estimated Budget (USD)
PILLAR 4 : GOOD GOVERNANCE & LEADERSHIP			
4.1 ESTABLISH A ROBUST LEGAL FRAMEWORK			
4.1.1 Prepare, adopt and implement the Water Law Decrees (Batches 1 & 2)	Q1 2025	MoEW	250,000
4.1.2 Prepare the studies and undertake the surveys needed for Batch 3 decrees, and issue the decrees	Q1 2027	MoEW	5,000,000
4.1.3 Revise and enact the legislative and regulatory modifications related to governance and internal organization of WEs	S1 2024	WEs	200,000
4.1.4 Revise and adopt the new WEs' organization decrees	S1 2024	MoEW + WEs	150,000
4.1.5 Establish a new compensation and benefits structure	2025	WEs	N/A
4.1.6 Assess the MoEW's internal organization and mandates and propose reorganization and capacity-building plan	S1 2024	MoEW	150,000
4.1.7 Review and modify MoEW's supervisory functions	S1 2024	MoEW	N/A
4.2 STRENGTHEN SECTOR OVERSIGHT & DIGITIZE MoEW'S PROCEDURES			
4.2.1 Create a strategy implementation and monitoring unit at the Ministry	Q2 2023	MoEW	950,000
4.2.2 Create the Water Sector Monitoring Unit within MoEW	2027	MoEW	N/A
4.2.3 Establish a new supervisory framework for MoEW	S1 2025	MoEW	N/A
4.2.4 Set up a unit in charge of WEs' performance monitoring within MoEW tutelage department	2026	MoEW	150,000
4.2.5 Develop the framework of the external audit and evaluation of WEs	S1 2026	MoEW	N/A
4.2.6 Define the digital transformation road map of MoEW to develop its capacities to generate, collect, manage and disseminate data on the national level	End 2024	MoEW	250,000
4.2.7 Implement digital transformation at MoEW	2030	MoEW	3,000,000
4.3 UNIFY SECTOR INTERVENTIONS			
4.3.1 Define and adopt a Unified Intervention Framework piloted by the Ministry	Q2 2024	MoEW	N/A
4.3.2 Define a unified monitoring tool for all sector projects	Q2 2024	MoEW	N/A
4.3.3 Develop the Ministry's multi-annual (3-year) programming, in line with the objectives defined in this strategy	S2 2024	MoEW	N/A
4.3.4 Secure support for the continuity of sector dialogue led by the Ministry	2024-	MoEW+	N/A
4.3.5 Create and lead thematic working groups	Q1 2024	MoEW+	N/A
4.3.6 Establish and initiate an Annual Sector Review	June 2024	MoEW	N/A
4.4 COMMUNICATE WITH CITIZENS			
4.4.1 Define the structure of MoEW annual report template	End 2024	MoEW	N/A
4.4.2 Develop communication strategy for MoEW and WEs	2025	MoEW	500,000
4.4.3 Design and launch national communication campaign on the water sector	2026	MoEW	
		Pillar 4 Estimated budget up to 2035 :	**10,600,000**

STRATEGY STRUCTURE



GENERAL OVERVIEW

INTRODUCTION

Despite having relatively abundant water resources compared to most neighboring countries, the water sector in Lebanon faces significant and pressing challenges. Unprecedented demographic pressure caused by the influx of displaced Syrian populations into Lebanon, deterioration of water quality due to heavy pollution and insufficient wastewater treatment, accelerated impacts of climate change on water quantity, quality and spatial distribution, and the overall social, political and economic fragility of the country that reached a critical point of collapse in 2019, constitute the most impactful challenges encountered over the past 12 years.

Nevertheless, the Ministry of Energy and Water believes that Water is Lebanon's sole available natural resource and, therefore, is key to its overall economic and social development. For that reason, this strategy sets the ground for an accelerated progress towards a stronger, more resilient and more sustainable national water sector.

SECTOR VISION

Empowering Lebanon's water sector to achieve equitable access to public water, wastewater and irrigation services through sustainably managed water utilities, while ensuring water security and a climate resilient sector for future generations.

SECTOR MISSION

Sustainably manage and efficiently distribute our water resources, ensuring safe, equitable and affordable access to public services, while restoring water quality, paving the way for an Integrated Water Resources Management. We are dedicated to promoting economic and social development for the benefit of our nation.

GUIDING PRINCIPLES

Four guiding principles allow the fulfilment of the sector's mission:

1. Integrated water resources management

IWRM promotes the coordinated development and management of water resources in order to maximize economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. The Water Act 192/2020 promotes IWRM under the concept of "Sustainable Water Management" and the development of basin schemes, and requires an eventual adoption of this approach in water policies where feasible.

While the current lack of data availability on water resources does not allow the Ministry to plan based on the IWRM requirements of the Water Code, yet the Ministry is designing its development projects and management mechanisms from an integrated perspective and is supporting Water Establishments and other stakeholders to guide their work in alignment with this approach. It is therefore highly critical to establish consolidated data management and decision support system as an imperative tool towards solid IWRM.

2. Citizen-centered services

The Water Act clearly states in article 2: "All humans have the fundamental right of access to water sufficient for their needs, as a basic requirement for a dignified life, including sanitation."

To ensure citizens' rights to adequate water services, this strategy revolves around the sustainability of public services. Although infrastructure development aims at providing an improved access to citizens, sustainability of services, and trust between citizens and Water Establishments, can only be restored through building resilient institutions and addressing financial, commercial, institutional and capacity-building aspects of the sector. Therefore, projects promoted under this strategy address all these aspects as integral and imperative components of infrastructure development.

Alongside the right of citizens to access improved public water services, citizens have the obligation to pay for the services provided. Article 2 continues to state: "All that in exchange for the payment of water usage subscription fees". Such a mutual relationship is the only way to attain longevity of the sector.

3. Resilience and energy efficiency

As in many countries in the world, Lebanon is facing the impacts of climate change and the rise in energy costs. Efforts should therefore target increasing the sector's resilience and energy efficiency.

Resilience is manifested in increasing the sector's capacity to monitor the quantity and quality of water resources, allowing it to improve the country's water security, especially through increasing its storage capacities in a scientific, evidence-based manner.

Energy efficiency is reached by increasing the sector's reliance on renewable energy sources – especially solar energy and hydropower projects dedicated to the water sector.

Efficient practices of water supply through system metering, automation and overall enterprise digitization result in the reduction of Non-Revenue Water (NRW) and enhance the sector's financial sustainability, optimizing the operating costs as well as the volumes produced.

4. Stakeholders engagement

- User Participation: Projects in the sector will be designed and implemented using participatory approaches. User participation is key for reaching the overall objective of setting up sustainable services as it is vital for ensuring willingness to pay for services, as well as people's acceptance of associated land use and water resource allocation constraints. The guiding principle for water sector project design and implementation primarily considers users' needs.
- Stakeholders' Alignment and Coordination: There are currently many governmental and non-governmental stakeholders working in the water sector and this diversity should be seen as an asset. However, approaches may vary widely from one stakeholder to another, which can result in disjointedness, a waste of available resources and poor sharing of data and knowledge. The Ministry defines the common rules and approaches to be adopted by all stakeholders and requires a well thought sector dialogue mechanism to ensure that all stakeholders are aligned with its strategy and policies.

SECTOR OBJECTIVES

Following the multiple crises that hit Lebanon since 2019 and resulted in a deteriorated level of service, it is estimated that, currently, not more than 50% of the population has regular and sufficient access to public water services and less than 25% has access to acceptable wastewater services. Since it is unlikely that Lebanon will reach SDG 6 targets by 2030, this strategy sets overall objectives to be reached by 2035 adapted to the country's current context and based on the assumption that the necessary resources will be made available over the strategy's implementation period.

The sector's objectives are classified under 4 pillars as follows:

Pillar 1: Enhanced Water Security

- By 2035, national water storage capacities are increased to 838 million cubic meters.
- By 2035, a data management and monitoring system is fully operational at the Ministry.
- By 2035, compliance with water quality improvement and pollution prevention measures as identified in the Water Act is fully achieved.
- By 2035, proper water allocation allows an increase in available hydropower production capacity from 282 MW to 325 MW[1].

Pillar 2: Improved Provision of Public Services

- By 2035, 90% of the population has regular and sufficient access to publicly provided water services (currently, drinking water network covers 80% of users with intermittent supply).
- By 2035, 60% of the population's wastewater is collected and treated through publicly managed systems (currently, wastewater network covers 60% of users and only 8% of generated volumes are treated to secondary levels).
- By 2035, irrigation efficiency is increased from 8400 m3/ha/yr to 6,720 m3/ha/yr (that is, from 60% efficiency to 75%), and irrigable lands increased from 100,000 ha to 138,000 ha.

Pillar 3: Sustainable Utilities

- By 2028, operating costs of water and wastewater services are recovered through adjustment of tariff, increased collection (80%) and subscription (75%) and reduced cost of production.
- By 2028, the Water Sector Transformation Program has started financing the transformation of the sector.
- By 2030, 15% of the annual turnover of Water Establishments is mobilized for investment in further development of the service.
- By 2035, Non-Revenue Water[2] (NRW) is reduced by 25 percentage points (from the currently estimated national average of 50%).

[1] Reference: Ministry of Energy and Water's Policy Statement of March 2022.

[2] The 50% NRW does not include volumes of water billed but not collected, as these are accounted for in the uncollected bills, which constitute the Collection rate. If both volumes were merged into one indicator, NRW would increase to around 65%.

- By 2035, cost of energy is reduced by 30% through adoption of energy efficient techniques and sustainable practices, including promoting renewable energy sources in the water sector associated with improved water storage infrastructure.
- By 2035, digital transformation of the Water Establishments has been fully achieved.

Pillar 4: Good Governance and Leadership

- By 2030, sector reforms related to governance, performance management, and monitoring & evaluation are fully implemented at the Ministry of Energy and Water.
- By 2035, digital solutions and advanced technologies for data driven decision making at the Ministry of Energy and Water are fully implemented.

While the objectives of this strategy feed directly into SDG 6, they also contribute to reaching SDG 2 (zero hunger), 7 (affordable and clean energy), 13 (climate action), 14 (life below water), 15 (life on land) and 17 (partnerships for the goals).

In the following sections, we detail the current situation of the four pillars and identify the initiatives and actions that will be undertaken to reach the stated objectives.

PILLAR 1: ENHANCED WATER SECURITY

CURRENT SITUATION

Although the poor water resources monitoring system in Lebanon makes it difficult to develop an accurate countrywide water balance based on current rainfall, it is estimated that Lebanon has around 6 billion cubic meters of available freshwater resources per year. Yet, Lebanon has a relatively high level of water stress that is likely to increase in the coming years. Water resources could be sufficient to cover all future needs, but only if these water resources are better managed.

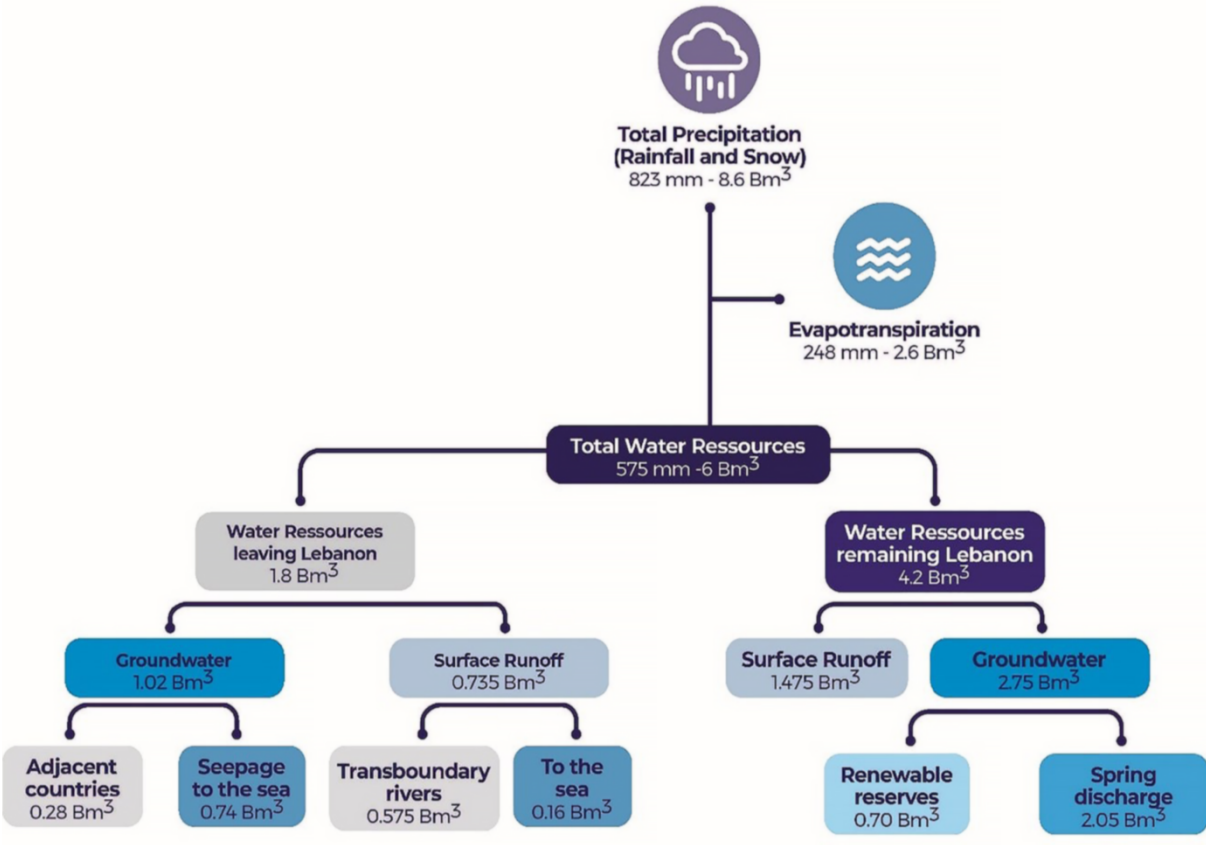


Figure 1 National Water Balance (2020)

This strategy updates the annual water balance of the 2012 NWSS (which was based on the review of FAO 2008 where ETP was estimated at 50%). The estimated ratio of total losses (evapotranspiration and other losses) is 30% equivalent to 2,579 Mm3, closer to UNDP 2014 real evapotranspiration figures which range between 16% and 26% of the total precipitation. The same figures of FAO 2008 were adopted for the water outflow leaving Lebanon, with the total surface water outflow estimated at 735 Mm3/year, of which 160 Mm3 to the sea and the total groundwater outflow leaving Lebanon estimated at about 1,020 Mm3/year of which 740 Mm3 to the sea.

Hence, the water resources remaining in Lebanon are 4,225 Mm3 /year of which 700 Mm3 as dynamic groundwater reserves, 2,050 Mm3 as springs discharge and 1,475 Mm3 as surface runoff, estimated

from the average flows measured by the Litani River Authority hydrometric service between 1990 and 2013 and other private hydrometric records.

In summary, the real evapotranspiration is estimated at 30% of total precipitation, total surface runoff inside and outside Lebanon about 25% and groundwater infiltration about 45%.

It should be noted that the annual water balance should not be adopted for water management plans at national scale. Rather, water management plans should be based on water balances estimated at the watershed scale as part of the IWRM approach.

INITIATIVES TO MITIGATE CLIMATE CHANGE AND INCREASE WATER SECURITY

Comparison of end-of-century projections and the 1986-2005 baseline period shows that temperatures could rise by up to 3.2°C. It also indicates a drop in rainfall of 4% to 11% (depending on the RCP scenario chosen), suggesting drier conditions and more consecutive dry days, which are indicative of a longer dry summer season. This relatively small drop in rainfall will be accompanied by an increase in intense episodes of rain that will reduce water infiltration. This combination of significantly less wet and substantially warmer conditions will result in a hotter and drier climate. In other words, the consequences of the accelerating impact of climate change will increase water stress in Lebanon. Moreover, under a warming climate, it is expected that snowpack dynamics will change resulting in a shift towards more runoff compared to the current contribution of snowpack to groundwater recharge and spring discharge.

The National Water Balance shows high volumes of unexploited surface water, which, when coupled with the impacts of climate change and the shift in wet and dry seasons as well as the intense precipitation episodes, naturally directs the strategy towards increasing national storage capacities, where technically, financially and environmentally feasible. However, this is not a stand-alone initiative. To have a comprehensive approach to Water Security, and to ensure the sector is well-prepared to address the multiple impacts of climate change on the availability of water resources, this strategy focuses on three additional key initiatives which are: monitoring of water resources, mitigating and preventing water pollution, and investing in technological innovations for water efficiency. These inter-connected components, described hereafter, will help improve the overall resilience of the water sector.

INITIATIVE 1.1: INCREASE NATIONAL STORAGE CAPACITIES

Surface storage is a high-level priority under this strategy. The construction of storage facilities, where financially, technically, and environmentally feasible, is the primary recommended measure for meeting water needs. A substantial proportion of Lebanon's water resources comes from surface water flowing into rivers, and thus well-designed surface storage facilities are unavoidable to ensure optimal use of this water. Dams and lakes play a crucial role in supplying water for drinking and irrigation purposes, alleviating the stress that is currently being practiced on groundwater.

Current water storage capacity in Lebanon is estimated to be 232 million cubic meters (static) and 315 million (dynamic), which is far from meeting the growing demand and building enough resilience to the risks posed by the impacts of climate change. There are many dam projects currently underway in Lebanon but, despite being close to completion, some of the work has been put on hold since 2020, due to funding shortages. The priority is therefore to complete all existing projects. Completion of the

9 dams identified as priority would increase Lebanon's water storage capacity to 838 million cubic meters by 2035.

The construction of dams allows for an increase in hydropower production, and this feeds directly into the objectives of the Ministry of Energy and Water's Electricity Policy Statement of March 2022, which envisages a potential addition of 112 MW generated from hydropower sources.

Table 2 List of operational dams in 2024

	Storage (Mm^3/y)		Height (m)	Usage	Beneficiary
	Static	Dynamic			
Chabrouh Dam	9	11	65	Potable/Irrigation	BMLWE
Ballout Lake	0,5	0,5	15	Potable/Irrigation	BMLWE
Qaysamani Lake	1	1	15	Potable	BMLWE
Brissa Dam	0,8	0,8	35	Irrigation	NLWE
Kouachara Lake	0,4	0,4	11	Irrigation	NLWE
Yammouneh lake	1,5	1,5	7	Irrigation	BWE
Qaraaoun Dam	220	300	62	Potable/Irrigation/ Hydropower	LRA
	233.2	**315.2**			

Table 3 Potential Additional Hydropower Generation by 2035

(corresponding to the commissioning of Batches 1&2 dams - See Table 4 below)

Hydropower Station	**GWh/Y**	**MW**
Nahr el bared – Run of river	11	1.3
Mseilha dam	3	.3
Janneh – Run of river (peak)	207	24
Boqaata Run of river (peak)	129	15
Choumariyeh dam	19	2
	369	**42.6**

Table 4 List of Priority Dams (2024 – 2035)

	Storage (Mm3/y)		Height (m)	Usage	Beneficiary
	Static	Dynamic			
Batch 1 : Dams to be completed by 2030					
Boqaata Lake	6	12	72	Potable	BMLWE
Janneh Dam	38	95	160	Potable/Irrigation/ Hydropower	BMLWE
Mseilha Lake	6	12	35	Potable/Irrigation	NLWE
Balaa Dam	1.2	2.2	35	Potable	NLWE
Bisri Dam	125	125	73	Potable/Irrigation	BMLWE
Total Batch 1 :	**176.2**	**246.2**			
Batch 2 Dams to be constructed by 2035					
Aazzounieh	4	4	-	Potable/Irrigation	BMLWE
Choumariyeh	28	120	60	Potable/Irrigation/ Hydropower	SLWE/LRA
Nahr el Bared	37	90	-	Potable/Irrigation	NLWE
Assi - phase 1	-	63	10	Irrigation	BWE
Total Batch 2 :	**69**	**277**			
Total Batch 1 & 2 :	**245.2**	**523.2**			
Batch 3 Dams to be constructed beyond 2035					
Dar Baachtar	7	- -	- -	Potable/Irrigation	NLWE
Ibl el Saki	50	- -	- -	Potable/Irrigation	SLWE
Damour	42	- -	- -	Potable/Irrigation	BMLWE
Assi Phase 2	15	- -	- -	Irrigation	BWE
Noura El Tahta	35	- -	- -	Potable/Irrigation	NLWE
Younine Dam	5.8	- -	- -	Irrigation	BWE
Massa	8	- -	- -	Irrigation	BWE
Khardaleh	128	- -	- -	Potable/Irrigation	SLWE/LRA
Maasser el Chouf	2.2	- -	- -	Potable	NLWE
Total Batch 3 :	**293**	**- -**			
Grand Total* :	**771**	**1131****			

* Including dams operational in 2024

** Not including batch 3 for which data is not available yet

INITIATIVE 1.2: MONITOR WATER RESOURCES

Numerous studies and estimations are available in the sector, several public and private institutions monitor surface water, snow coverage and precipitation, and many attempts were made to monitor groundwater. All these data need to compiled and centralized at the Ministry through the creation of a comprehensive data management system, the Integrated Hydrological Information System (IHIS). Such a system plays a strategic role in decision-making because it is based on real scientific data, enables proper infrastructure planning, and provides citizens and stakeholders with easy access to reliable information. Effective decisions on integrated water resources management, flood and drought management, the locations and feasibility of dams, groundwater extraction, rainwater harvesting and allocating water resources to economic sectors can only be made if reliable and updated data are available. The IHIS also supports Lebanon's commitments to international conventions and initiatives such as the Nationally Determined Contribution (NDC) under the Paris Agreement.

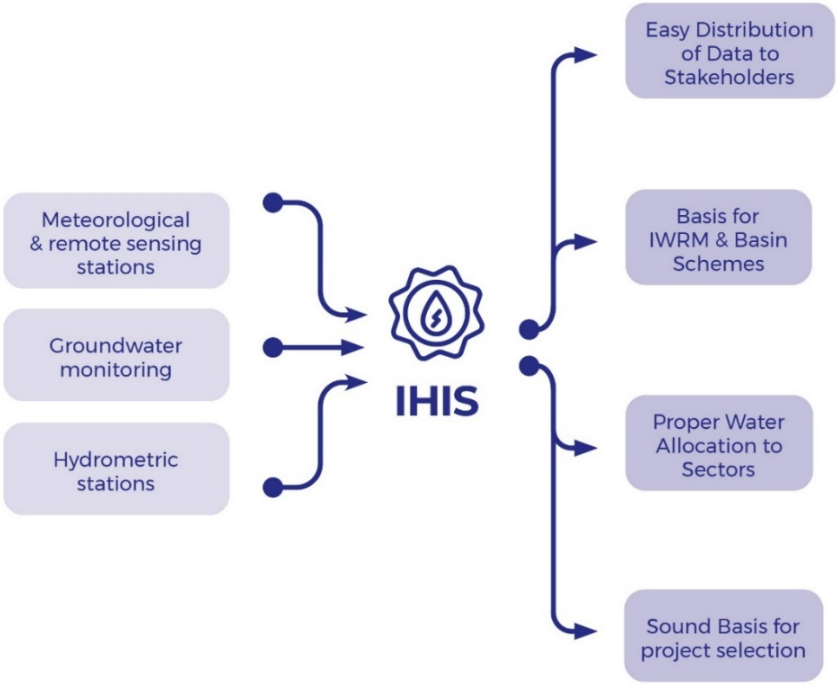


Figure 2 Outlook on the Integrated Hydrological Information System

Current measurement stations do not cover all available water resources across Lebanon; therefore, an expansion of the networks of meteorological stations, hydrometric stations, snowpack and rainfall monitoring stations, and groundwater monitoring stations is necessary. Data from these networks would be digitally transferred to the data center at the Ministry where processing and analysis takes place completed by a dedicated decision support system.

INITIATIVE 1.3: IMPROVE WATER QUALITY

Water quality is on top of the Ministry's priorities over the next years, as it has a significant impact on public health. The Water Act 192/2020 elaborates in several articles the importance of water quality and water safety, identifying responsibilities and establishing mechanisms. By early 2025, a detailed national water quality monitoring plan, entailing the below elements, will be set:

Governance:

- identify responsibilities of the different public institutions in relation to water quality, starting with the Ministry and the Water Establishments, and also the Ministry of Environment, Ministry of Public Health, Ministry of Industry, Ministry of Agriculture, and the Municipalities.
- set up mechanisms to enact LIBNOR standards for Treated Wastewater Reuse.
- identify the management and monitoring responsibility of the international community in relation to water quality in refugee camps and informal settlements.

Monitoring plan:

- establish a comprehensive surface water, groundwater, and irrigation water quality monitoring framework within the Data Management System of the Ministry.
- set up mechanisms and upgrade laboratories to enact the LIBNOR standards for Drinking Water 2016 at Water Establishment level.

Polluter pays:

- establish mechanisms to hold citizens and the private sector accountable for polluting activities as per the Polluter Pays principle stipulated in the Water Act.

Water Safety Plans:

- establish staff training programs to identify pollution sources and develop Water Safety Plans (in line with the 2017 WHO guidelines).
- develop mechanisms to identify protection zones around water sources as per Water Act Article 84.

Infrastructure:

- set up a clear timeline for the construction and completion of wastewater systems, taking the LIBNOR standards for Treated Wastewater Reuse into account, where feasible.
- equip Water Establishments' laboratories and training their staff on LIBNOR standards for Drinking Water 2016. Currently, Water Establishments are not able to implement LIBNOR's 2016 Drinking Water quality standards, which cover all types of potential hazards, due to lack of laboratory equipment and expertise. The 2035 target is to achieve 95% compliance to quality standards and to regularly update their water safety plans.

INITIATIVE 1.4: DEVELOP A STORMWATER MANAGEMENT PLAN

As a key impact of climate change, Lebanon is particularly vulnerable to altered precipitation patterns and more frequent and intense storms. These changes can exacerbate existing stormwater management challenges, increasing the risk of flooding, erosion, and water pollution.

Although this is a shared responsibility among several ministries, the Water law 192/2020 identified specific mandates regarding stormwater management in relation to proper management of water resources, flood risks and water quality. Stormwater runoff causes life threatening flooding events in the arid areas of the Beqaa and damages property around river banks. Unmanaged stormwater results in losing precious water resources to the sea after severely impacting citizen's lives. It carries

pollutants such as sediment, debris, oil, and chemicals from urban and industrial areas into water bodies. This is a significant concern, as pollutants can degrade water quality and harm aquatic ecosystems, posing risks to public health and the environment.

Coordination among ministries, municipalities, and other stakeholders involved in stormwater management must be enhanced and the Ministry is committed to proactively initiate discussions to define comprehensive approaches to address stormwater-related challenges. These measures include: 1) identifying areas prone to flooding, erosion, and water pollution and assessing the potential sources and volume of stormwater runoff; 2) developing a stormwater management plan that considers both grey (engineered) and green (natural) infrastructure solutions; 3) enacting legislation and regulations specifically targeting stormwater and flood management; 4) establishing a comprehensive monitoring program to track stormwater quality and quantity, as well as the performance of stormwater management infrastructure.

INITIATIVE 1.5: ENHANCE NATURAL AQUIFER RECHARGE

The Ministry will set up a developed program for naturally recharging major aquifers that feed springs used for public water supply.

The aim of this program is to identify potential locations for natural aquifer from surface water, precipitation and snowmelt, in order to store water underground during winter time, and use it during the recession seasons (summer & autumn). This includes undertaking assessments and surveys along the major rivers and valleys of Lebanon, to identify locations where check dams can be implemented.

Prior to implementation of works, a set of activities will be undertaken, including:

- Geological and hydrogeological data collection.
- Hydrometric data collections.
- Selection of major springs in the vicinity of these rivers.
- Identifications of aquifers feeding these springs.
- Detailed geological surveys at a scale of 1/20,000 of the areas where such aquifers exist.
- Data analysis and selection of potential sites in these rivers where flowing surface water might be in connection with the aquifers that feed these springs.
- Tracer tests to confirm the presence of the underground connections.
- Assessment of the volume of surface water that could be recharged.
- Prioritization of sites.
- Preparation of Detailed designs, tender documents and detailed BoQs of the selected works.

INITIATIVE 1.6: ENGAGE IN RESEARCH AND INNOVATION

The Ministry will join forces with academic institutions and private organizations to set up Lebanon's Water Resilience Innovation and Research program. The aim of this program is to develop innovative and adapted solutions to Lebanon. Collaboration plans with interested academic institutions and research centers will be developed to refine the focus of work and areas for joint reflection and actions.

The main areas of research include, but are not limited to: 1) enhancing the performance and resilience of water supply and (collective and onsite) wastewater systems; 2) adapting irrigation techniques to reduce the 'water per crop' ratio; 3) exploring the potential of reusing treated wastewater throughout the country; 4) developing techniques for low-cost and nature-based wastewater treatment solutions; 5) managing the water cycle in dense urban settlements; 6) monitoring water quality (including the use of crowd-sourcing to collect relevant data); 7) rainwater harvesting at domestic and community levels; 8) reusing sludge in agricultural processes; 9) artificial recharging of aquifers.

Lebanon's Water Resilience program is results-oriented and will be implemented with the support of research and innovation-oriented public and private organizations in Lebanon and abroad.

PILLAR 1 ACTION PLAN

Table 5 Pillar 1 Action Plan

Actions	Target Date	Leading Institution	Estimated Budget (USD)
PILLAR 1 : ENHANCED WATER SECURITY			
1,1 INCREASE NATIONAL STORAGE CAPACITY			
1.1.1 Resume construction of Priority 1 - Batch 1 dams: Bisri, Janneh, Boqaata, Mseilha, and Balaa	2030	MoEW	595 000 000
1.1.2 Secure funds and implement Priority 1 - Batch 2 dams: El Bared, Assi phase I, Azzounieh, and Choumariyeh (Kfarsir)	2035	MoEW	441 000 000
1.1.3 Secure funds and Implement Priority 2 Batch 3 dams: Noura el Tahta, Dar Beechtar, Assi phase 2, Younine, Massa, Ibl el Saqi, Khardaleh, Damour & Maasser el Chouf	*After 2035*	*MoEW*	*1 335 000 000*
1,2 MONITOR WATER RESOURCES			
1.2.1 Set up a centralized data management and integrated hydrological information system (IHIS) at the Ministry	2030	MoEW	16 000 000
1.2.2 Develop protocols and procedures for the digital transfer of data from meteorological stations, hydrometric stations, and groundwater monitoring stations to the Ministry's data center.	2030	MoEW	
1.2.3 Expand the network of stations, including meteorological, hydrometric, and groundwater monitoring stations, to cover resources across	2035	MoEW	
1,3 IMPROVE WATER QUALITY			
1.3.1 Design and implement a comprehensive surface water, groundwater, and irrigation water quality monitoring framework	2030	MoEW	N/A
1.3.2 Develop and implement pollution prevention measures on water sources and recharge zones	2024-2035	MoEW	N/A
1.3.3 Complete geological and hydrogeological mapping & develop Water Safety Plans nationwide	2035	MoEW + WEs	5 000 000
1,4 DEVELOP A STORMWATER MANAGEMENT PLAN			
1.4.1 Define measures for stormwater management, identify stakeholders' responsibilities and develop a stormwater management plan	2026	MoEW	3 000 000
1,5 ENHANCE NATURAL AQUIFER RECHARGE			
1.5.1 Assess & implement NAR works across major rivers and valleys	2035	MoEW	20 000 000
1,6 ENGAGE IN RESEARCH & INNOVATION			
1.6.1 Set up the Water Resilience innovation and research program	2030	MoEW	N/A
		Pillar 1 Estimated budget up to 2035 :	**1 080 000 000**

PILLAR 2: IMPROVED PROVISION OF PUBLIC SERVICES

Updating the NWSS aims at identifying the projects that should be implemented to fill the gaps between what has been implemented and what remains to be executed to cover the needs of the population in terms of potable water supply, wastewater collection, and water for irrigation. The strategy targets the projected needs in year 2035. Therefore, it is necessary to assess future population and needs per capita at an acceptable level of accuracy in order to identify relevant solutions and propose cost effective projects.

Based on the Central Administration Statistics of 2019 and the World Bank 2021 figures on the populations residing on the Lebanese territories, it was estimated that around 6.9 million people are resident of Lebanon. Estimations on population growth and water demand are based on previous experience of the Consultants who contributed to this strategy and who have extensive experience in the water sector in Lebanon. The figures discussed in this section can be reliable enough to form a solid basis for the purpose of this strategy.

WATER DEMAND

Drinking Water Demand

The current population of Lebanon is estimated to be around 7 million, a figure that includes Palestinian refugees and displaced people from Syria.

Table 6 Lebanon's population in 2020

Lebanese	Palestinian refugees	Displaced Syrians	Total
4,842,050	250,562	1,800,000	6,892,612

Based on an assumed average annual growth rate for Lebanese of 1.5% in rural areas and 0.75% in urban areas, and a growth rate of 2% for displaced Syrians and Palestinian refugees, the overall population present in Lebanon is expected to rise to almost 9 million by 2035.

The main water consumption-related calculations are:

- Average water needs throughout the country (including physical losses of 25% and non-domestic consumption of 20%): 200 liters per capita and per day;
- Produced wastewater flow: 80% of water needs (excluding physical losses);
- Infiltration: 10% of wastewater produced.

As long as Lebanon hosts refugees and displaced populations, it is important to calculate their impact on the national water balance although their consumption is not accounted for in the water balances at district and system levels. The following assumptions are made:

- For displaced Syrians living in informal settlements, the allocated water supplied to on-site water tanks is: 50 l/cap/day
- For Palestinian refugees living in camps and displaced Syrians living outside informal settlements and benefitting from the public network, the allocated water is: 80 l/cap/day (including losses and non- domestic consumption).

Irrigation Water Demand

Based on the inventory of the irrigation schemes across the country, presently irrigated land area is around 100,000 ha.

Under the presently prevailing irrigation conditions, considering network losses and the irrigation practices, the irrigation efficiency is around 50 to 60%. The average irrigation water requirement for a representative hectare (ha) at the country level is currently around 8,400 m^3/ha/year.

Table 7 Current irrigation water demand

Beneficiary institution	Irrigated area (ha)	Commonly used rates in Lebanon (m^3/ha/year)	Total needs (Mm^3/year)
NLWE	23,600	7,500 (most of the area is coastal)	177
BMLWE	5,835	6,500 (most of the area is at high altitude)	38
BWE & LRA	66,115	9,000 (most of the area is in-land/dry	595
SLWE & LRA	4,210	7,500 (most of the irrigated area is coastal)	32
TOTAL	100,000	8,435 (average irrigation water requirement	842

It is estimated that irrigated areas will cover 138,000 ha in 2035, with irrigation efficiency rising from 60% to 75% following the modernization of on-farm irrigation practices and the rehabilitation or construction of concrete or piped conveyance schemes, and catchment facilities.

Irrigation development in the future is conditioned by 1) Implementing new projects, and 2) Securing new water resources such as storage structures & water wells.

The construction of the proposed projects would allow for the irrigation of an additional 38,000 ha at the country level, as shown in

Table 8 below.

Therefore, the present irrigation water requirement at the country level is 842 Mm3 and would reach 927 Mm3 in 2035, should the proposed project be implemented.

On the other hand, the Agricultural National Census of 2010 (MoA, 2010) reveals that only 50% of the irrigated area is supplied from natural surface water whereas the rest is supplied by “expensive” underground water or from hill lakes. Also, it shows that 65% of the irrigated areas are permanently irrigated whereas the remaining 35% are partially irrigated. Therefore, it is estimated that around 75% of the current Irrigation water requirement, i.e. around 630 Mm3, are presently sustained by available water for irrigation and reflect the actual/real Irrigation water consumption figure across the country. Out of these 630 Mm3 it is estimated that 315 Mm3 are covered by surface water and the rest by groundwater.

Table 8 Proposed Development of Irrigable Lands and Associated Projects

	Priority	Proposed new irrigation projects	Irrigable land (ha)
NLWE	3	Noura el Tahta	4200
	2	Dar Baachtar dam	
	1-3	Hill lakes	730
			4 930
BMLWE	2	Hill Lakes	730
			730
BWE	1-2	Aassi dams	6 000
	3	Massa dam	1 200
	3	Younine dam	1 600
			8 800
SLWE & LRA	1-2	Conveyor 800	13 250
	2	Khardaleh dam	1 300
	2	Choumariyeh dam	4 000
	2	Ibl el saki dam	3 800
	2	Hill lakes	1 235
			23 585
		Rounded total	**38 000 ha**

PROJECTED DEMAND BY SECTOR (2024-2035)

Based on water balance calculations at water system level, the dynamic seasonal variation in the rural population, and the above assumptions for irrigable land, the projected annual water demand in 2035 can be broken down as follows:

- **Domestic water demand**: 706 million cubic meters
- **Non-domestic water demand**: 101 million cubic meters
- **Agricultural water demand**: 927 million cubic meters
- **Total water demand in the country**: 1,734 million cubic meters

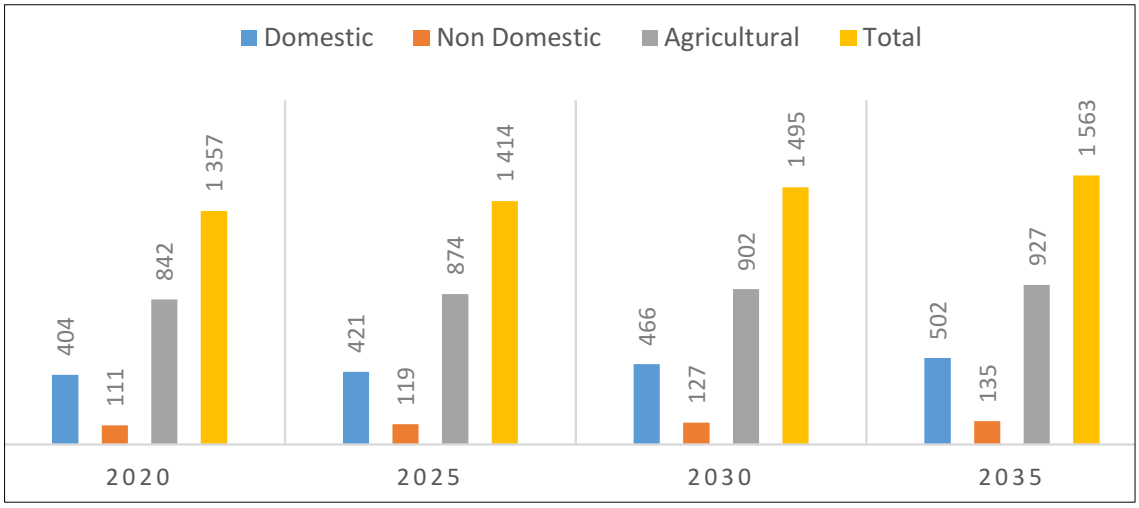


Figure 3 Projected demand (2024 – 2035)

WATER SUPPLY

According to the estimated national water balance, the currently available water quantity from various types of resources amounts to 4,225 million cubic meters, only 1,912 million of which are being used.

The annual renewable available water volumes are estimated to be around 2,050 Mm3 as springs, 1,475 Mm3 as rivers, and 700 Mm3 as aquifer reserves (public and private wells).

Table 9 Available and exploited water resources in 2020

Source	Available resources (Mm^3/year)	Exploited resources (Mm^3/year)
Rivers	1,475	14
Springs	2,050	594
Aquifer reserves (public & private wells)	700	900
Dams (static)	-	314 (232)
Total	**4,225**	**1,912**

The strategy envisages the following actions for an optimized exploitation of available resources: Exploited resources from springs will be optimized either through direct usage or by capturing them in dams; resources from public wells will increase by 100 Mm3 every 5 years while extraction from private wells will be decreased by 100 Mm3 to reach its half in 2035; and dams' storage will be increased according to the list of prioritized dams in this strategy.

PROJECTED SUPPLY BY SOURCE TYPE (2020-2035)

Projected used water resources in 2035 will amount to 2,470 million cubic meters, broken down as follows:

Table 10 Water supply mix progression (2024 - 2035)

	Exploited Resources (Mm^3/year)			
Source	2020	2025	2030	2035
Rivers	14	14	14	21
Springs	594	617	656	656
Public wells	350	450	550	635
Private wells	640	540	440	320
Dams (Dynamic)	315	315	561	838
Total	**1 913**	**1 936**	**2 221**	**2 470**

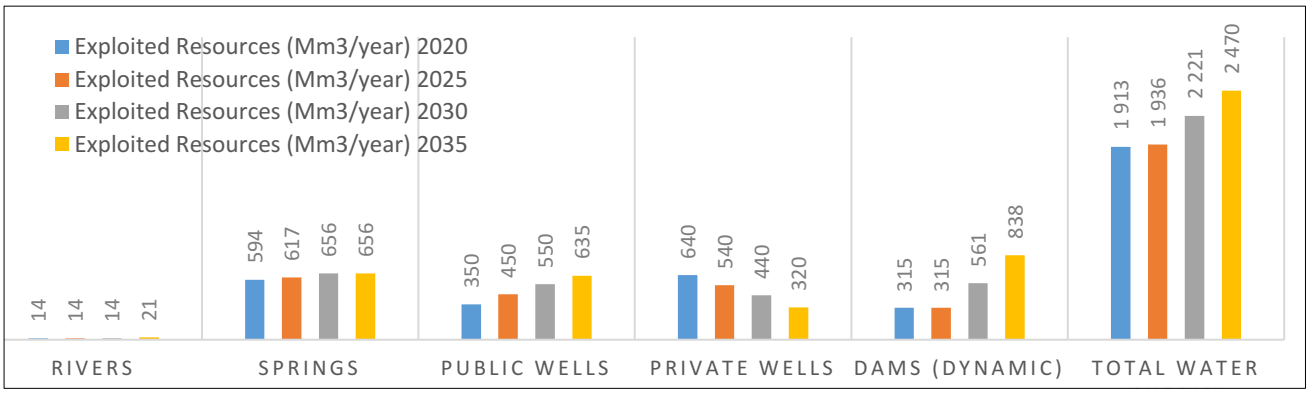


Figure 4 Projected water supply mix (2024 - 2035)

DEMAND VERSUS SUPPLY

Predicted water supply (assuming 25% of physical losses) exceeds annual demand by 20% to 25% between 2020 and 2035. This gives the illusion that demand is always met despite the numerous pressures exerted on Lebanon's water resources.

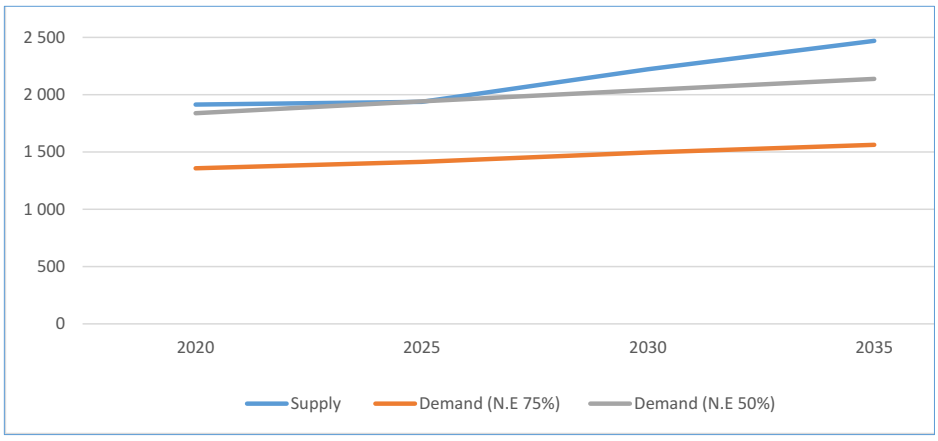


Figure 5 Projection of Demand versus Supply (2020 – 2035)

However, the unbalanced distribution of available resources across the country, the current and projected impacts of climate change in water availability and the lack of effective supply systems make water resources management challenging, and there are substantial losses through illegal connections. Thus, if no efforts are made to increase and optimize resources and properly manage consumption, certain regions of Lebanon are likely to experience severe water shortages. It is therefore crucial that surface storage is enhanced, spring catchments are rehabilitated, exploitable quantities of water are optimized, groundwater extraction is restricted to rechargeable volumes, and wastewater effluent (municipal, industrial waste, agricultural discharges, and solid waste) is treated and reused for irrigation.

The projected demand and supply are highly affected by network efficiency. An improvement in NRW from 50% to 75% results in a better model at national level, but local water balances are the correct indicators of needs and are necessary for a better assessment of the required investments.

INITITATIVES TO COVER THE INFRASTRUCTURE GAP

The National Water Strategy reviews all water, wastewater, and irrigation needs. It assesses the current operational systems and identifies the gaps to be filled in order to cover the population's needs. These gaps are translated into projects within the three sectors, and these projects are prioritized in order of urgency and impact on services. There are two priority levels in place over the strategy period. Priority 1 runs from 2024 to 2030, priority 2 from 2031 to 2035. Priority 3 investments have a target date later than the strategy implementation period but are indicated for anticipation and comprehensiveness.

It is worth noting that water supply, wastewater and irrigation master plans will be completed and/or updated to ensure that the entire country is covered and that all investments are prioritized using reliable and recent information on existing systems.

The ultimate objective of this pillar is to achieve the following targets by 2035:

- 90% of the population has regular and sufficient access to publicly provided water services (from 80% drinking water network coverage with intermittent supply).
- 60% of the population's wastewater is collected and treated through publicly managed systems (from 60% wastewater network coverage and 8% treated volumes).
- irrigation efficiency is increased from 8400 m3/ha/yr to 6,720 m3/ha/yr. (from 60% to 75%), and irrigable lands increased from 100,000 ha to 138,000 ha.

INITIATIVE 2.1: DEVELOP PUBLIC WATER SUPPLY SERVICES

In line with the 'citizen-centered service' principle and sector recovery needs, immediate priority is given to projects which completion, rehabilitation or optimization was hindered by the financial collapse of 2019 and are negatively affecting the Water Establishments' financial sustainability. Development projects targeting an improved access to water services are prioritized according to the below criteria.

Priority 1: focus on highly populated areas

- Develop, expand and rehabilitate water resources to cover drinking water demand, focusing on water systems that have a negative water balance in 2020.

- Improve water storage capacities coupling it with installation of solar systems at source level where technically and financially feasible.
- Rehabilitate transmission pipelines and distribution networks to increase their capacities, expand their coverage and decrease NRW.

Priorities 2 and 3: focus on less densely populated areas

- Develop, expand and rehabilitate water resources to cover drinking water demand, focusing on water systems that have a negative water balance in 2030.
- Improve water storage capacities coupling it with installation of solar systems at source level where technically and financially feasible.
- Rehabilitate transmission pipelines and distribution networks to increase their capacities, expand their coverage and decrease NRW.

Table 11 Infrastructure targets by 2035

Beneficiary institution	Transmission lines (km)	Reservoirs (nbr)	Wells (Nbr)	Pumping stations (nbr)	Distribution networks (km)
NLWE	367	51	29	2	803
BMLWE	421	139	36	17	3 268
BWE	483	169	110	16	1 072
SLWE	623	200	17	15	- -
Total	**1 874 km**	**560**	**187**	**45**	**6 888 km**

INITIATIVE 2.2: DEVELOP PUBLIC WASTEWATER SERVICES

For wastewater, the prioritization of investments focuses on optimizing and rehabilitating current systems and treatment plants and increasing the number of house connections.

Priority 1: focus on highly populated and environmentally critical areas

- Rehabilitate and operate existing WWTP's; Complete wastewater networks connected to existing WWTP's; Connect households to nearby networks.
- Expand, rehabilitate and upgrade major WWTPs that have insufficient treatment capacity to treat current wastewater flow.
- Separate wastewater networks from stormwater systems.
- Develop guidelines for sludge collection, disposal and adequate treatment, and develop pilot sludge treatment facilities.
- Develop pilot projects to reuse treated wastewater for municipal or irrigation needs.

Priority 2: focus on less densely populated areas

- Construct new WWTPs and sewer networks in the more densely populated neighborhoods.

- Expand and upgrade existing WWTPs that have insufficient treatment capacity to treat influent wastewater flows in the near future.

Priority 3: focus on remote areas

- Construct new WW systems in less densely populated areas and install onsite sanitation where relevant.
- Install small wastewater treatment units in remote areas using robust and low-cost technologies.
- Develop pilot projects to reuse treated wastewater for urban (in densely populated areas) or irrigation needs (in less populated areas).

INITIATIVE 2.3: DEVELOP PUBLIC IRRIGATION SERVICES

Agriculture being the primary consumer of water, specific attention should be given to rationalize the use of this vital resource. This involves effectively managing surface water and safeguarding groundwater reserve. Developing irrigation infrastructure relies on the estimated water balance of each scheme, translated as such:

- A severe water deficit indicates the need for providing new water resources by increasing water harvesting through promoting hill lakes.
- A limited water deficit could be mitigated through network upgrade by i) rehabilitating and modernizing existing irrigation infrastructure to reduce water losses, ii) improving water efficiency by upgrading water catchment and deviation structures, and iii) repairing concrete broken structures and converting earthen channels into concrete ones.
- A remarkable surplus due to a positive water balance indicates the need for water storage through dams.

The sustainability of these investments is contingent upon a strong coordination mechanism with the Ministry of Agriculture to adapt agricultural practices to the necessity of preserving both the quantity and the quality of resources, particularly in the context of climate change.

Priority 1: focus on improving efficiency

- Rehabilitate and modernize existing irrigation systems, repairing broken concrete structures, and converting earth channels into concrete channels.
- Develop water resources by increasing rainwater harvesting and storage through the promotion of hill lakes and priority irrigation dams.
- Modernize on-farm irrigation systems to optimize water usage.
- Accelerate the upgrade or execution of wastewater treatment plants up to LIBNOR's acceptable TSE reuse standards in conjunction with crops selection criteria.

Priorities 2 & 3: focus on developing new sources

- Convert open channel systems into pressurized piped system to enhance modernization of on-farm irrigation systems.
- Develop water resources by increasing rainwater harvesting and storage through the promotion of hill lakes and priority irrigation dams.

- Expand modernization of on-farm irrigation systems and solar irrigation to optimize water usage and energy efficiency.
- Increase reuse of treated wastewater in irrigation.

PILLAR 2 ACTION PLAN

Table 12 Pillar 2 Action Plan

(See table 11 above)

Actions	Target Date	Leading Institution	Estimated Budget (USD)
PILLAR 2 : IMPROVED PROVISION OF PUBLIC SERVICES			
2.1 DEVELOP PUBLIC WATER SUPPLY SERVICES			
2.1.1 Complete water master plans	2028	MoEW + WEs	1 500 000
2.1.2 Implement priority 1 projects	2028	MoEW + WEs	55 000 000
2.1.3 Implement priority 2 projects	2035	MoEW + WEs	765 000 000
2.1.4 Implement priority 3 projects	*After 2035*	*MoEW + WEs*	*460 000 000*
2.2 DEVELOP PUBLIC WASTEWATER SERVICES			
2.2.1 Complete wastewater master plans	2028	MoEW + WEs	1 000 000
2.2.2 Implement priority 1 projects	2028	MoEW + WEs	65 000 000
2.2.3 Implement priority 2 projects	2035	MoEW + WEs	338 000 000
2.2.4 *Implement priority 3 projects*	*After 2035*	*MoEW + WEs*	*2 000 000 000*
2.3 DEVELOP PUBLIC IRRIGATION SERVICES			
2.3.1 Complete irrigation master plans	2030	MoEW + WEs	1 500 000
2.3.2 Implement priority 1 projects	2028	MoEW + WEs	7 000 000
2.3.3 Implement priority 2 projects	2035	MoEW + WEs	116 000 000
2.3.4 Implement priority 3 projects	*After 2035*	*MoEW + WEs*	*1 637 000 000*
		Pillar 2 Estimated budget up to 2035 :	**1 350 000 000**

PILLAR 3: SUSTAINABLE UTILITIES

CURRENT SITUATION

Water Establishments currently face several challenges that slow down their growth into sustainably operating utilities, and they can be summarized as follows:

FINANCIAL AND COMMERCIAL CHALLENGES

- **Low collection rate** ranging between 30% and 65% (national average: 45%). This low level creates severe cash flow problems that affect the Water Establishments' operational and investment capacities.
- **High operating costs** due to high energy consumption, inefficient facility design, and unsuitable repair and maintenance practices, restricting the Water Establishments' development and investment capacity.
- **Insufficient subscription rates**: customer databases are incomplete, and there is a discrepancy between the number of official customers and the actual number of people benefiting from water from the supply systems.
- **Inadequate tariff**: the flat tariff model combined with the current tariff levels, impacted by the devaluation of the Lebanese pound, do not allow the Water Establishments to achieve financial breakeven and ensure reliable service delivery.
- **Poor monitoring and reporting capacities leading to poor financial transparency**, due to the lack of standardized reporting and annual external audits of the Water Establishment's financial statements and ledgers. This results in a lack of financial transparency around their financial status, hindering the Ministry's ability to properly monitor the utilities and fairly compare their performances.

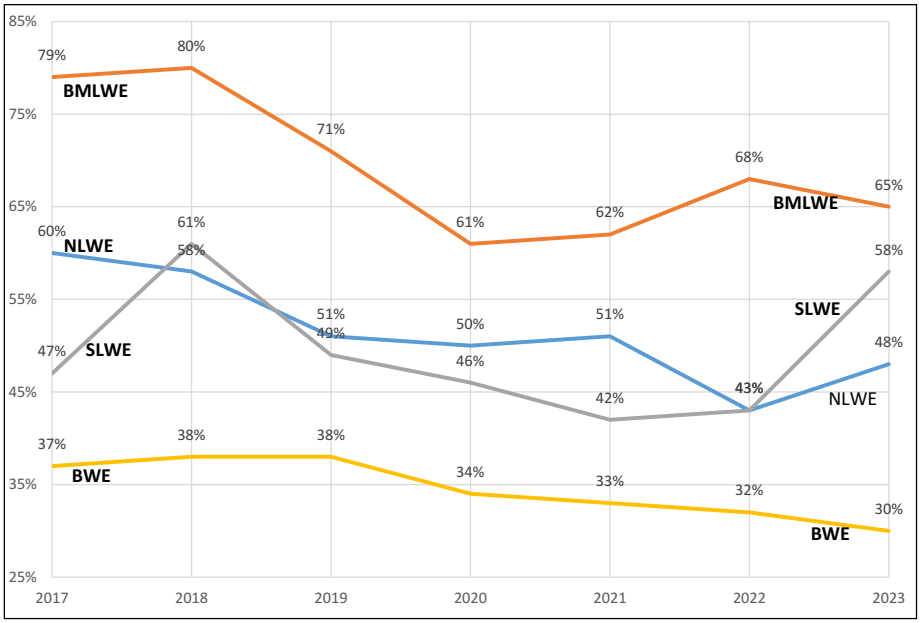


Figure 6 Collection rate per WE from 2019 to 2023

OPERATIONAL CHALLENGES

- **High energy consumption**, inefficient design of facilities and inappropriate repair and maintenance schedule lead to high operating cost.
- **Inexistent performance monitoring framework** due to the lack of reliable data as well as lack of digital tools and processes.
- **Inexistent NRW management**: the lack of DMAs and source monitoring has both a technical (no proper measurement of NRW) and financial impact (inability to precisely identify areas for optimizing revenue collection and OPEX).
- **Lack of adequate contract arrangements** between Water Establishments and private stakeholders or other public institutions. The Ministry has taken steps to formalize the performance-based contracting framework, to be adopted by all stakeholders with a clear division of roles and responsibilities. Water Establishments lack the internal technical skills to properly supervise private or public operators.

ORGANIZATIONAL CHALLENGES

- **Outdated internal organization**, cumbersome bureaucratic procedures and a lack of internal structure and recruitment autonomy.
- **Lack of skilled human resources**: in all three sectors (water, wastewater and irrigation), organizational charts do not reflect the Water Establishments' legal mandates. The legal number of employees is high and the majority are laborers. There is less focus on middle management (to work on strategic approaches) and skilled expertise (to work on improving performance).

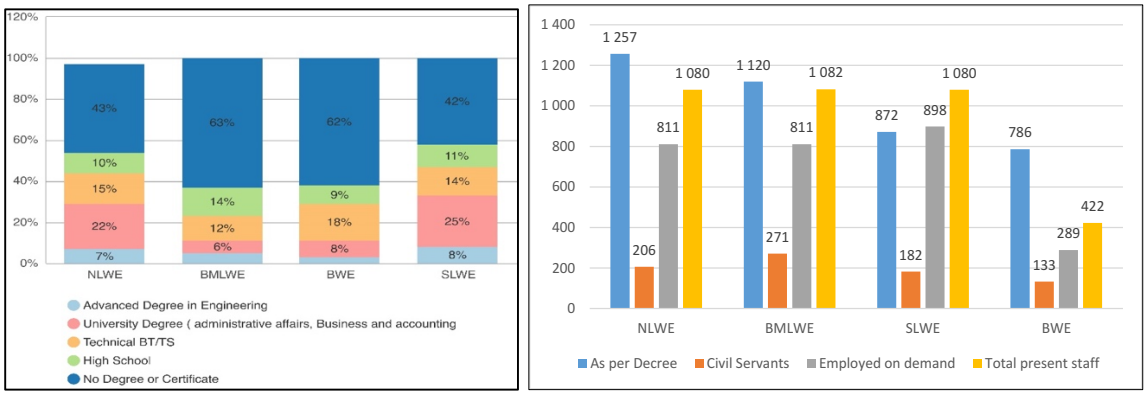


Figure 7 Current situation of Human Resources in the WEs (2020)

INITIATIVES FOR SUSTAINABLE GROWTH

To tackle these challenges, the Water Establishments will undertake structural internal reforms and operational actions with the support of the Ministry and the sector's international partners.

INITIATIVE 3.1: ESTABLISH FULL COST RECOVERY

The Water Establishments will recover all operating expenses by 2028 through:

- Enhancing service management efficiency.

- Reducing operating costs.
- Increasing the tariff and moving to a progressive pricing strategy.
- Increasing collection and subscription rates.

To help the Water Establishments reduce their OPEX, priority will be given to reducing energy consumption. The Water Establishments will regularly conduct energy efficiency audits to identify potential improvements. Wherever technically possible and economically justified, the Water Establishments will increase their use of solar energy to ensure that up to 20% of the power generated comes from solar in 2028 and 30% by 2035. Finally, hydropower assessments will be conducted on existing systems. However, in line with the recovery objectives outlined by this strategy, the Ministry will make sure that Water Establishments will be the first Electricity customers to benefit from a preferential electricity rate whenever the situation of the electricity sector allows for it.

The Water Establishments will update their customer databases using the results of a national-customer census. Customer categories will be reviewed in order to optimize the tariff structure. Water Establishments will seek to identify illegal connections and increase subscription and collection rates. They will also carry out public outreach campaigns that are supported by the Ministry at national level.

The targets for 2028 are as follows:

- Increase collection rate to 80%
- Increase subscription rate to 75%
- Reduce NRW by 15 percentage points

Besides increasing the water tariff, the Water Establishments will update the tariff structure, moving from the current flat rate to a more progressive tariff, using adequately defined customer categories to optimize their revenue.

A tariff strategy will be developed in 2024 that takes into consideration water, wastewater and irrigation as well as the financial, operational and social principles, and is aligned with the overall objective of achieving financial sustainability.

INITIATIVE 3.2: DEVELOP AUTOMATION, DIGITIZATION &PERFORMANCE MONITORING

The performance monitoring framework defined by the Ministry will be adopted and implemented to regularly monitor system performance. The Water Establishments will monitor and report on all KPIs and develop adequate monitoring tools and processes. For reporting, the Water Establishments are to adopt the annual reporting template set out in the bylaws of the Water Act 192/2020.

Launching digital transformation of the Water Establishments will start as soon as 2024 to enable them to modernize and automate operations and increase reporting capacity. The Digital Enterprise Transformation is intended to govern the development process of the Water Establishments into self-sustaining utilities that are adequately financed through an adequate tariff structure based on optimized business, engineering, operations, management, and financial principles. This will be attained through a digitized platform comprising automated water management systems that process collected data of integrated parameters to produce an intelligent decision vehicle. Predesigned workflows and processes will autonomously enhance efficiencies and lower costs. This action will define in 2024 a costed and phased strategic roadmap for the Water Establishments digital transformation and by fully implementing activities planned for the period up to 2035.

As part of the digital transformation of Water Establishments and to carry out system performance monitoring, the Water Establishments will need to progressively introduce metering at all levels. Systematic volumetric metering will become mandatory for all new water supply systems (including rehabilitated systems), both at source and district level, and for all industrial and large-scale consumers. For all existing systems, metering will be introduced in two phases:

2024-2029: Preparatory phase

- 100% metering of sources and water production facilities
- 40% district metering (including preparatory studies and construction works)
- 100% metering for industrial, touristic, and large scale consumers
- 15% domestic metering on an experimental basis, with no change in rates, to collect and analyze data and establish new tariffs

2030-2035: Scaling up phase

- 100% macro metering (sources, production, and storage facilities)
- 60% district metering for all water systems
- 40% domestic metering, which means 10,000 new meters installed per WE per year; focusing on densely populated areas

Finally, Water Establishments will expand the use of the performance-based contracts template when recruiting private or public 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 Water Establishments and private operators will be reviewed and long-term performance-based contracts introduced, especially for the wastewater management. It is crucial that Water Establishments 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 materials will be adapted to ensure the efficiency and sustainability of this contractual framework.
- In the long-term (by 2035), the adopted contract format should become the norm.

Regarding the development of contracts between Water Establishments and public institutions, the regulatory framework of this procedure will be adopted, and a contract template will be validated by the Ministry and the Water Establishments by the first half of 2024.

INITIATIVE 3.3: RESTRUCTURE INTERNAL ORGANIZATIONS OF WATER ESTABLISHMENTS

Overall performance of the Water Establishments is strategic for the sector's sustainability, and a reshuffling of their organizational structures is key to enhance performance. This will be done through the following actions:

- Revising and adopting new Water Establishment organizational decrees to ensure effective development, greater autonomy and performance-based management.

- Reviewing and assessing Water Establishment governance and internal organization and implementing a comprehensive reorganization process and capacity-building plans. This includes defining a new organizational chart for the Water Establishments and enabling the Water Establishments to hire more qualified technical staff (specialists in leakage detection, WWTP management, for instance) and allowing layoffs where and when required.
- Establishing a new wage policy and revising the Water Establishment staff salary structure.

INITIATIVE 3.4: DEVELOP & IMPLEMENT THE WATER SECTOR TRANSFORMATION PROGRAM

The sector objective is transformation through the implementation of vital reforms necessary for a sustainable financial recovery.

To achieve this objective, Water Establishments will be supported by a flexible and innovative program mechanism that fosters implementation of the required transformational measures. This will take the form of a Water Sector Transformation Program (TP), which will be developed and implemented under the strategy.

Purpose of the Transformation Fund

One of the water sector's objectives is to recover its operating costs to ensure proper services to users by the year 2028. This is achieved by means of increased collection and subscriptions, together with proper adjustment of the tariff and an efficient reduction of NRW. Once recovery is achieved, efforts will be directed towards stabilizing the financial situation of the Water Establishments, followed by a developmental phase up until 2035.

The Transformation Program is intended to provide the Water Establishments with the resources needed for the implementation of their main operational reform priorities: reducing NRW, improving energy efficiency, increasing collection and subscription rates, implementing digital transformation, completing internal restructuring, hiring specialized staff, and ensuring proper work and capacity development environment.

Implementation Timeline

- **2024** - Preparation and development of guidelines and operational framework.
- **2025** - Setting up of the TP and supporting WEs in establishing their 3-year business plans.
- **2026** - TP to be fully developed and ready for implementation.
- **2026-2030** - Scaling-up phase using a results-based approach.
- **2030-2035** - Implementation of the exit strategy.

Funding Mechanism

The TP will constitute of activities targeting the sector's transformation, reflected in the business plans of the Water Establishments. These activities will be financed through contributions from all willing donors acting in the sector activities. Contributions can be adjusted in line with the sector's financial situation and progress made towards achieving financial sustainability and optimal service delivery.

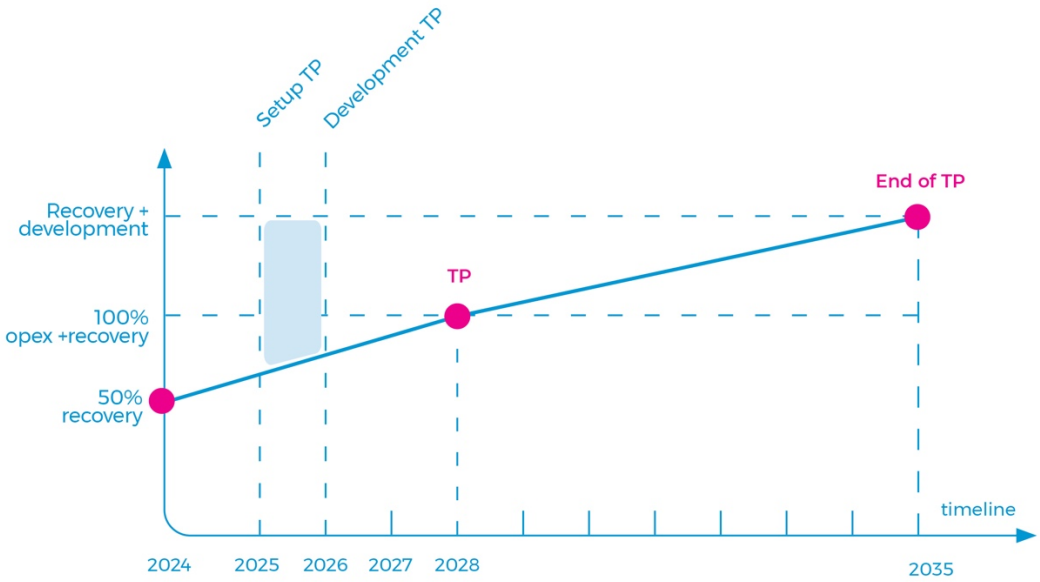


Figure 8 Progression of the Water Sector Transformation Fund (2024 – 2035)

Implementation Arrangements

The rules governing TP implementation and management include the following:

- The TP will remain active over the whole NWSS period.
- The TP is fully developed in 2026 and ready for implementation.
- The TP will be managed by a third-party appointed by the Ministry.
- A dedicated technical assistance team will be hosted by the Ministry to support Water Establishments with effectively implementing the TP activities and ensuring alignment with the NWSS.
- Funds will be allocated to Water Establishments based on KPI's and performance targets.
- An independent audit of the TP will be carried out on an annual basis.
- TP activities will include planning, capacity-building (including recruitment of specialized staff) and transformation-related investment costs.
- The TP will report to a steering committee (comprising representatives from the Ministry, the 4 Water Establishments, and selected international sector partners) on a quarterly basis.

The TP provides a strategic means of ensuring there is long-term financial support for the sector's recovery and transformation journey.

PILLAR 3 ACTION PLAN

Table 13 Pillar 3 Action Plan

Actions	Target Date	Leading Institution	Estimated Budget (USD)
PILLAR 3 : SUSTAINABLE UTILITIES			
3.1 ESTABLISH FULL COST RECOVERY			
3.1.1 Adopt a modernized tariff strategy	2024	WEs	N/A
3.1.2 Conduct a customer census and update customer database	2026	WEs	5,000,000
3.1.3 Source funds & support from donors & Government to bridge cost recovery gap	2024-2028	WEs + MoEW + GoL + Donors	N/A
3.1.4 Increase collection rate to reach 80%	2028	WEs	N/A
3.1.5 Increase subscription rate to reach 75%	2028	WEs	N/A
3.1.6 Develop & implement a NRW strategy & decrease NRW by 25 percentage points	2035	WEs	TBD
3.1.7 Increase the reliance on renewable energy and efficient storage practices to 30%	2035	WEs	TBD
3.2 DEVELOP AUTOMATION, DIGITIZATION & PERFORMANCE MONITORING			
3.2.1 Develop Metering at all levels:		WEs	
- Water production metering 100%	2029	WEs	20,000,000
- Water distribution district metering 40%	2029	WEs	50,000,000
60%	2035	WEs	
- Retail metering at subscribers level 15%	2029	WEs	25,000,000
40%	2035	WEs	
3.2.2 Conduct the Digital Transformation of WEs		WEs	
- Phase 1: Prepare road map for digital transformation	2024	WEs	0
- Phase 2: Implement digitization, including Automation, Scada systems, ERP	2024 2035	WEs	80,000,000
3.2.3 Standardize the structure of WEs' annual reports with KPIs to be monitored	Q1 2024	MoEW + WEs	N/A
3.2.4 Assess and revise performance-based contract with private operators	2030	MoEW + WEs	0
3.2.5 Develop regulatory framework for contracting with public institutions	2024	MoEW + WEs	0
3.3 RESTRUCTURE INTERNAL ORGANISATION OF WATER ESTABLISHMENTS			
3.3.1 Enact revised WE organizational decrees	2024	MoEW + WEs	0
3.3.2 Implement revised WE organizational structures	2025	WEs	N/A
3.3.3 Recruit specialized and qualified technical staff following appropriate legislative and regulatory modifications	2025	MoEW + WEs	N/A
3.3.4 Develop adapted capacity building plans	2025	WEs	N/A
3.4 DEVELOP & IMPLEMENT THE WATER SECTOR TRANSFORMATION PROGRAM			
3.4.1 Prepare and develop guidelines and operational framework	2024	MoEW + donors	N/A
3.4.2 Set-up the water sector transformation Program	2025	MoEW + donors	N/A
3.4.3 Provide necessary support to WEs to develop their 3-year business plans	2025	MoEW + donors	N/A
3.4.4 Adjust funding priorities based on results achieved and KPIs reached	2026-2030	MoEW + WEs+ donors	N/A
3.4.5 Ensure smooth transition to sustainable self-funding models for WEs	*2030-2035*	*MoEW + WEs+ donors*	*N/A*
	Pillar 3 Estimated budget up to 2035 :		**180,000,000**

PILLAR 4: GOOD GOVERNANCE & LEADERSHIP

CURRENT SITUATION

Suboptimal Coordination mechanisms

Several stakeholders work in the water sector in Lebanon including national-level public institutions (the Ministry, Water Establishments, Litani River Authority, CDR, and other ministries like MoA and MoE) and local public authorities (municipalities), as well as national and international NGOs, bilateral and multilateral development partners, UN institutions, associations, and private operators. Coordination among sector stakeholders is challenging, as many have their own approaches, priorities and focus areas, budgeting cycles as well as project preparation, implementation mechanisms and technical standards for infrastructure. Such discrepancies result in little transparency and accountability towards public institutions. The Water Act grants considerable sector oversight and management authority to the Ministry, which has developed a comprehensive coordination mechanism but still struggles to assume its full role due to lack of capacities (especially in terms of monitoring, evaluation and communication). The Current Water Sector Coordination Framework is shown on Figure 9 below.

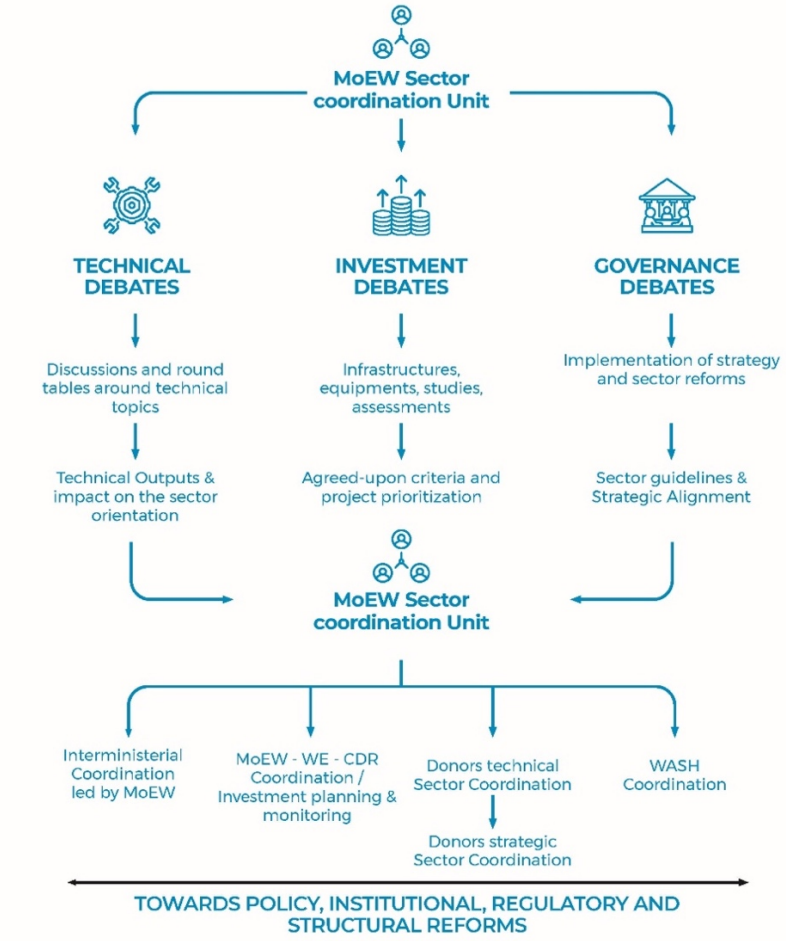


Figure 9 Current Water Sector Coordination Framework

Poor Monitoring & Reporting Structures and Lack of Transparency

On another hand, the Ministry and the Water Establishments, who are at the core of sector management and monitoring, lack the institutional capacity and technical tools to produce technical reviews and conduct proper reporting. Consequently, sector data are incomplete, have many discrepancies and do not enable systematic monitoring.

Sector transparency is also hampered by the insufficient and unreliable data communicated to users, widening the gap of trust between citizens and water establishments and negatively impacting the sector's financial viability.

Weak Service Provision

The multiplicity of challenges hinders the water sector's capacity to deliver services efficiently. They range from incomplete and unconsolidated legal framework, to underpaid, under skilled and insufficient human resources, to weak commercial, citizen-centered structures, and unstable financial contexts. The Water Establishments' performance falls behind recognized standards for publicly managed water utilities, with water shortages affecting customers in all sectors.

INITIATIVES FOR BUILDING GOOD GOVERNANCE

To have a better oversight of the sector, the strategy identifies four initiatives that could help the Ministry and the Water Establishments play their role fully.

INITIATIVE 4.1: ESTABLISH A ROBUST LEGAL FRAMEWORK

The multiplicity of legislation governing the sector results in overlaps, contradictions, and inconsistencies. In order to achieve proper functionality of the Water Act 192/2020, the Ministry conducted an in-depth review of all applicable water-related laws and compiled them into one consistent document. However, it will only be fully applicable once its bylaws (application decrees) have been developed and approved.

Also related to the legal framework are the organizational decrees of the Water Establishments that were developed in 2005 based on Act 221/2000, which will be reviewed and updated to ensure their alignment with the current situation.

The Ministry will undertake a comprehensive review of the roles and responsibilities of national stakeholders with respect to their involvement in the water sector. The approval of the Water Act application decrees will contribute significantly to this clarification.

Similarly, developing and regulating the contractual relationship between public authorities and private organizations will help improve sector governance.

This initiative further constitutes of the assessment of the Ministry's and the Water Establishments internal organizational structures as a preparation for their restructuring, which will allow them to fulfil their legal mandates as per the Water sector's governing laws. This will be complemented with capacity-building plans and training programs for their staff.

INITIATIVE 4.2: STRENGTHEN SECTOR OVERSIGHT & DIGITIZE MOEW'S PROCEDURES

Regular reporting and good quality data are key to ensuring the Ministry's ability to make informed, evidence-based decisions and efficiently manage the sector. It is also the best way of ensuring sector

accountability and promoting transparency. Therefore, the Ministry's supervisory functions will be revised and modernized.

It will oversee the Water Establishments' performance based on a set of Key Performance Indicators (KPIs) agreed upon between both entities, and will be incorporated in the latter's annual reports.

A framework will also be developed for the annual external independent audit of the Water Establishments.

A digital transformation roadmap for the Ministry will be established and implemented with the aim of achieving the following outcomes: 1- automate all processes and work flows related to permits and expropriation files, to allow for a smoother and more transparent relationship with citizens and other institutions; 2- establish a data center with online citizen accessibility and connect it to the digital centers at the Water Establishments; 3- digitally generate, collect, manage, and disseminate all water availability data at the national level; 4- initiate the archiving of existing files.

The strategy aims to develop digital tools and automated processes at the Ministry and at Water Establishments to enable swift and credible reporting and outcome monitoring, while keeping the provision of reliable and sustainable services to citizens as our ultimate goal. For that purpose, dedicated units within the Ministry and the Water Establishments will be created, trained and provided with the necessary hardware and software tools.

INITIATIVE 4.3: UNIFY SECTOR INTERVENTIONS

To efficiently lead the sector, the Ministry envisages the creation of a Unified Intervention Framework (UIF) that outlines the sector's interventions principles and priorities. All partners wanting to implement projects in the water sector will enter into a UIF agreement with the Ministry and/or the Water Establishments, by signing a Memorandum of Understanding as a sign of acceptance of and alignment with the sector's priorities and guidelines.

The key principles of the UIF are:

- Centralization of planning and decision-making at the Ministry level is reaffirmed.
- Sector monitoring framework led by the Ministry, including a common indicators dashboard for all sector projects and regular reporting by stakeholders to the Ministry using identical indicators through a dedicated online platform.
- Partners' alignment with the Ministry's and Water Establishments multi-annual (three-year) programming and budgeting in line with the objectives defined in the NWSS.
- Intervention principles defined and consolidated to ensure the proper allocation of funds towards the transformation of the sector as well as a service-focused approach for all project design and implementation.
- Multi-stakeholder initiatives coordinated and prioritized, particularly those that blend financing instruments, create common financing tools or pool financial resources.
- Sector dialogue facilitated and enhanced between the Ministry, the Water Establishments and active partners in the sector through thematic working groups, and other coordination platforms established by the Ministry as and when required to address major NWSS implementation-related topics.

- Annual sector review prepared and conducted by the Ministry, in close coordination with the Water Establishments, and by technical assistance resources as required. The outcomes of this annual review will be shared with all sector stakeholders and will influence sector programming and budgeting for the following three years.

INITIATIVE 4.4: COMMUNICATE WITH CITIZENS

Not only will the focus be on the institutional relationship between the Ministry and the Water Establishments, but also equally on the communication between the sector and the citizens or end-users of the public services. Building a relationship of trust is key for service sustainability. For that matter, the strategy identifies the following priority activities:

- Design and launch a national communication campaign for the water sector.
- Improve the content of existing websites, develop social media platforms and optimize outreach to users.
- Publish annual reports of Water Establishments on the Ministry's website as per Article 78 of the Water Act 192/2020.
- Implement communication and awareness campaigns with schools in alignment with the "Greening the Education" Program of the Ministry of Education and Higher Education.

As set out in Article 79 of the Water Act 192/2020, the Ministry will prepare and publish in the official Gazette an annual sector report that contains key figures and relevant data. The report will include sector procedures, qualitative and quantitative data, and information on ongoing programs and projects. It will also show the progress made towards target achievement as set up in the strategy. This report will be submitted to the Parliament and will feed directly into the annual sector review.

PILLAR 4 ACTION PLAN

Table 14 Pillar 4 Action Plan

Actions	Target Date	Leading Institution	Estimated Budget (USD)
PILLAR 4 : GOOD GOVERNANCE & LEADERSHIP			
4.1 ESTABLISH A ROBUST LEGAL FRAMEWORK			
4.1.1 Prepare, adopt and implement the Water Law Decrees (Batches 1 & 2)	Q1 2025	MoEW	250,000
4.1.2 Prepare the studies and undertake the surveys needed for Batch 3 decrees, and issue the decrees	Q1 2027	MoEW	5,000,000
4.1.3 Revise and enact the legislative and regulatory modifications related to governance and internal organization of WEs	S1 2024	WEs	200,000
4.1.4 Revise and adopt the new WEs' organization decrees	S1 2024	MoEW + WEs	150,000
4.1.5 Establish a new compensation and benefits structure	2025	WEs	N/A
4.1.6 Assess the MoEW's internal organization and mandates and propose reorganization and capacity-building plan	S1 2024	MoEW	150,000
4.1.7 Review and modify MoEW's supervisory functions	S1 2024	MoEW	N/A
4.2 STRENGTHEN SECTOR OVERSIGHT & DIGITIZE MoEW'S PROCEDURES			
4.2.1 Create a strategy implementation and monitoring unit at the Ministry	Q2 2023	MoEW	950,000
4.2.2 Create the Water Sector Monitoring Unit within MoEW	2027	MoEW	N/A
4.2.3 Establish a new supervisory framework for MoEW	S1 2025	MoEW	N/A
4.2.4 Set up a unit in charge of WEs' performance monitoring within MoEW tutelage department	2026	MoEW	150,000
4.2.5 Develop the framework of the external audit and evaluation of WEs	S1 2026	MoEW	N/A
4.2.6 Define the digital transformation road map of MoEW to develop its capacities to generate, collect, manage and disseminate data on the national level	End 2024	MoEW	250,000
4.2.7 Implement digital transformation at MoEW	2030	MoEW	3,000,000
4.3 UNIFY SECTOR INTERVENTIONS			
4.3.1 Define and adopt a Unified Intervention Framework piloted by the Ministry	Q2 2024	MoEW	N/A
4.3.2 Define a unified monitoring tool for all sector projects	Q2 2024	MoEW	N/A
4.3.3 Develop the Ministry's multi-annual (3-year) programming, in line with the objectives defined in this strategy	S2 2024	MoEW	N/A
4.3.4 Secure support for the continuity of sector dialogue led by the Ministry	2024-	MoEW+	N/A
4.3.5 Create and lead thematic working groups	Q1 2024	MoEW+	N/A
4.3.6 Establish and initiate an Annual Sector Review	June 2024	MoEW	N/A
4.4 COMMUNICATE WITH CITIZENS			
4.4.1 Define the structure of MoEW annual report template	End 2024	MoEW	N/A
4.4.2 Develop communication strategy for MoEW and WEs	2025	MoEW	500,000
4.4.3 Design and launch national communication campaign on the water sector	2026	MoEW	
		Pillar 4 Estimated budget up to 2035 :	**10,600,000**

ATTACHMENT – LIST OF PROPOSED PRIORITY PROJECTS