1 st Multi-Stakeholders Consultation Meeting on the Water-Energy-Food-Ecosystems Nexus in Lebanon: Current status and trends regarding Water Security

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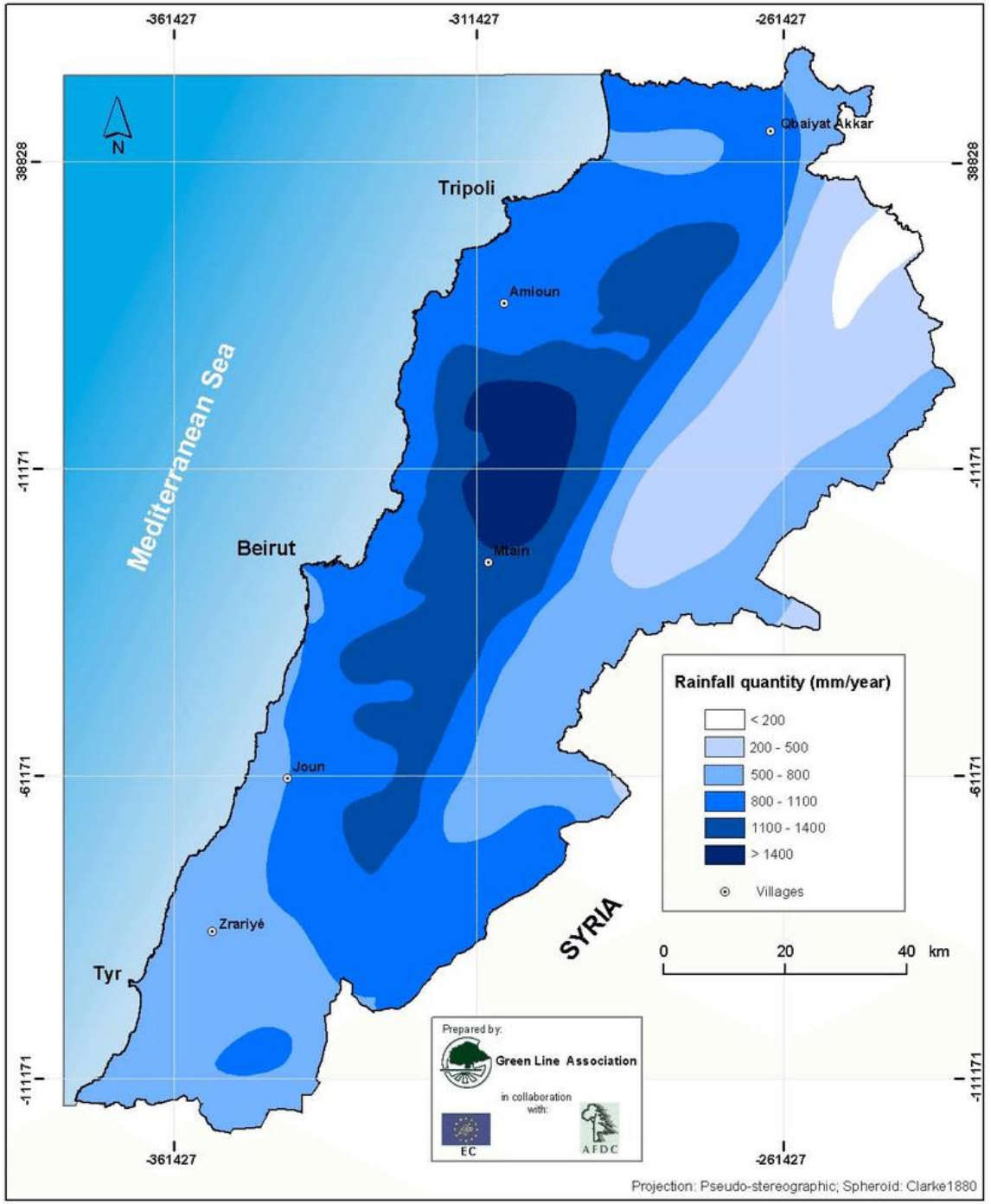
Outline

1. Brief Description of Current Situation of the Water Sector
2. The 2020 National Water Sector Strategy
3. Legal Framework
4. Interlinkages with other sectors
5. Needs and Opportunities in Water Resource Management

Water Resource Availability Estimations

- Lebanon receives 8,559 Mm^3 (million cubic meter) of precipitations yearly, of which 3,000 Mm^3 are estimated to fall in the form of snow.
- Lebanon has 8 major aquifers that store around 1,360 Mm^3 of water, of which 400 to 1,000 Mm^3 are exploitable



Water Resource Availability

- The groundwater supply :
  - over 50% of the irrigation demand a
  - 80% of potable water
- The excessive reliance on groundwater and the large number of illegal wells are threatening this resource and causing saltwater intrusion in coastal aquifers

Water Balance

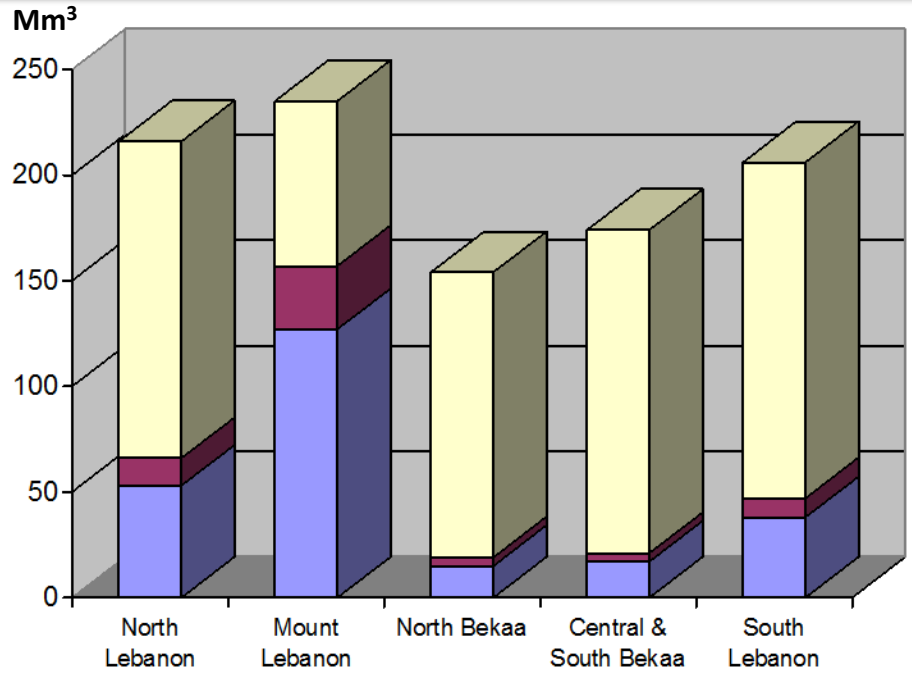
Designation	Flows (Mm^3)		
	Inputs	Outputs	Total
Total annual precipitation	8200		
Natural evaporation and transpiration		4100	
Losses in groundwater flowing towards neighboring countries		300	
Losses in surface waters flowing towards neighboring countries		648	
Sea spring sources		385	
Total renewable waters			**2700**
Ground water			**567**
Surface waters			**2200**

Global water balance in Lebanon : Non Conventional Water

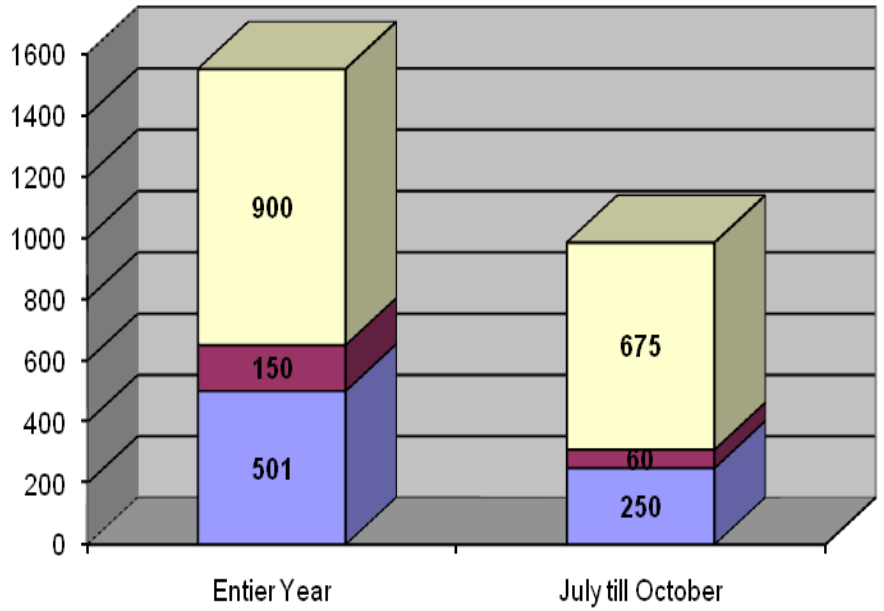
Designation	Flows (Mm^3)		
	Inputs	Outputs	Total
Non Conventional Water : **- (Wastewater Reuse)** **- Sea Water Spring**			**180** **(385)**
Total Non Conventional Water			**565** **(Mm3)**

NB: Climate Change reduction: 30% on the Total Renewable resource

Consumption by regions& sectors

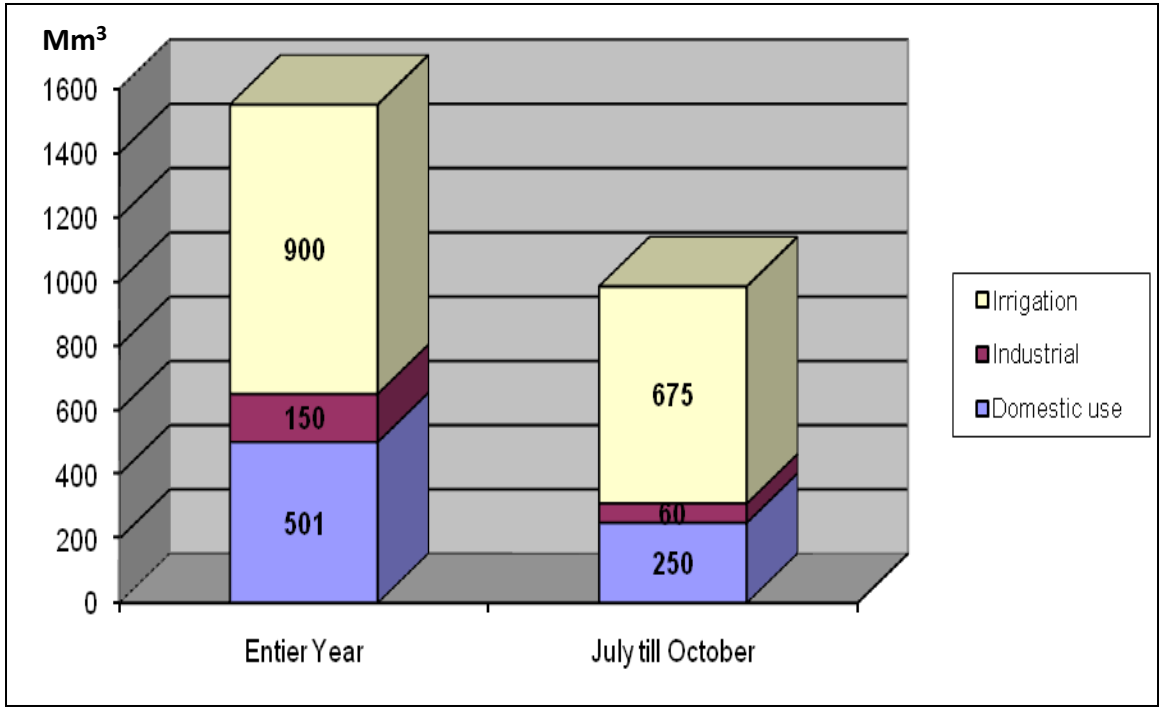


In million cubic meters (Mm^3)



70-80 % goes to irrigation

Water demand in Lebanon

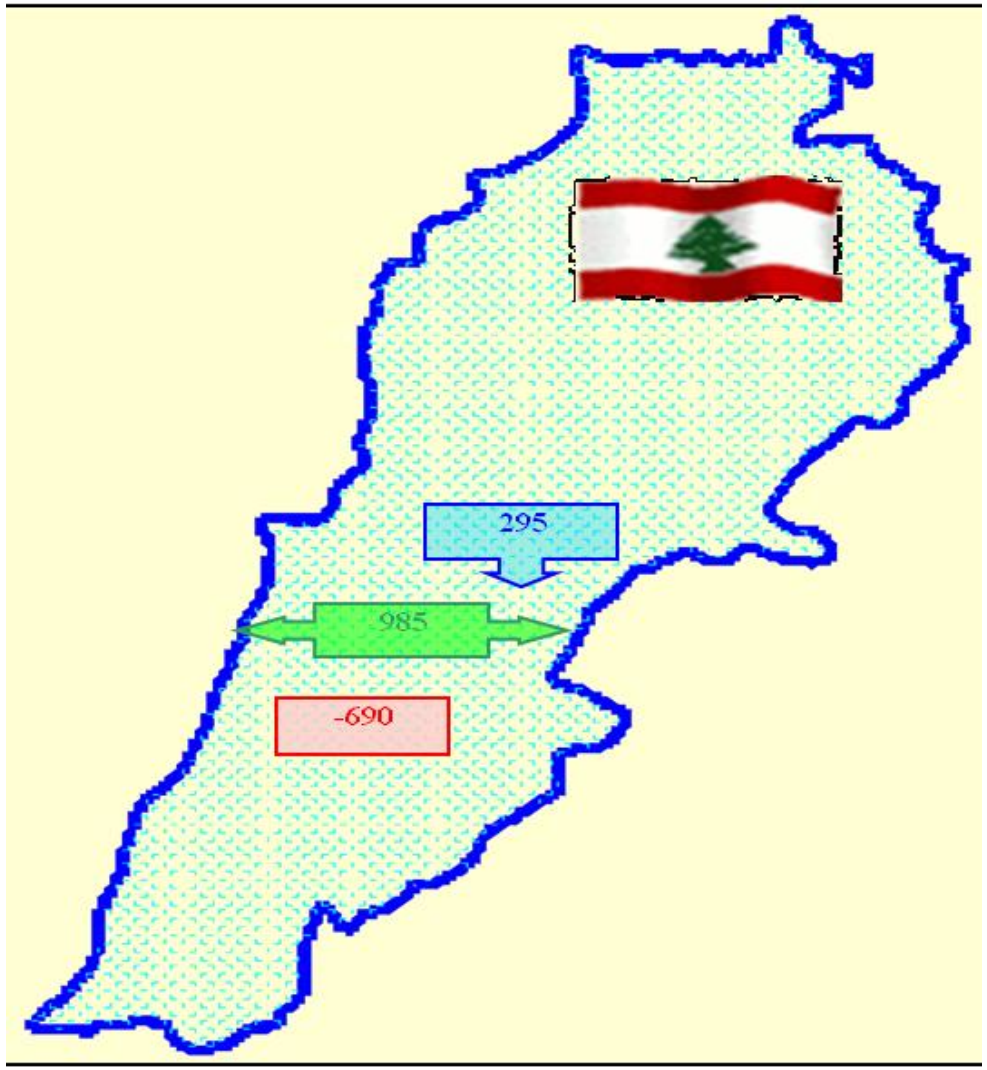


Total annual water consumption	
Estimated (2010)	Projected (2040)
1.8 billion m^3/year	3.4 billion m^3/year

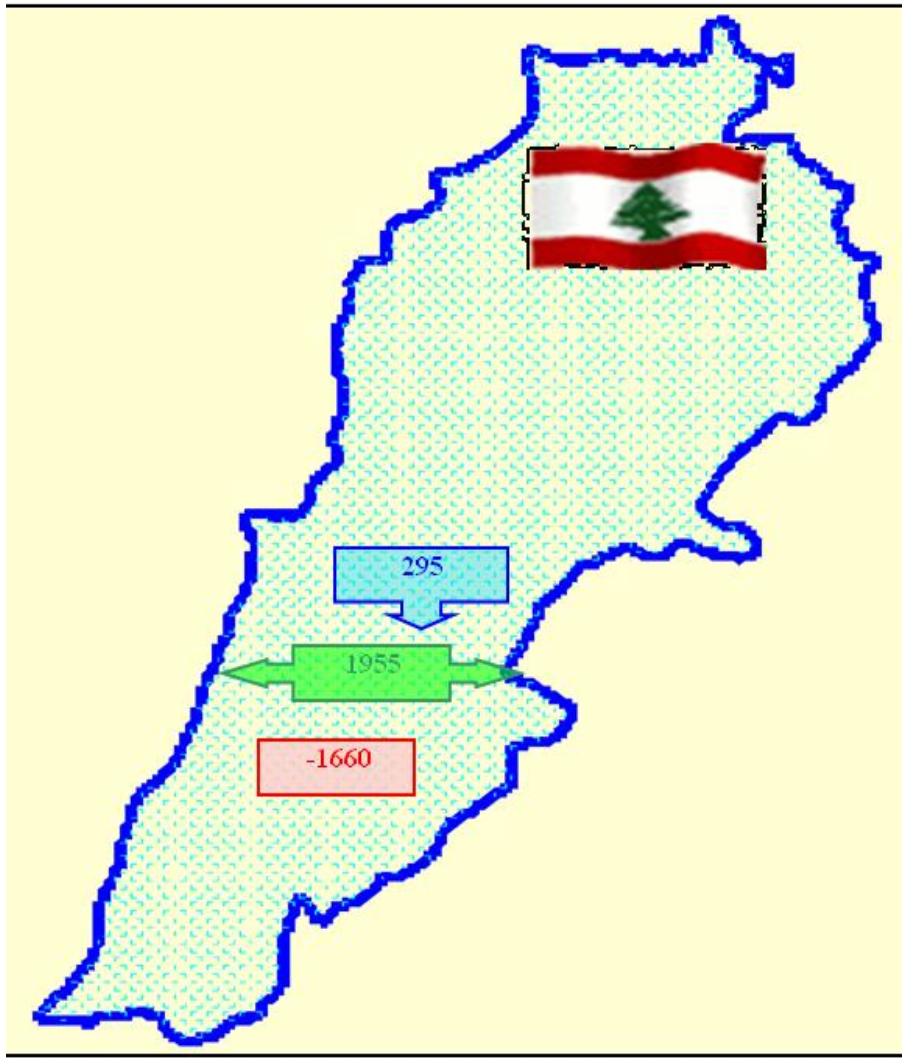
Water balance-Global

July-October (Millions of m^3)

Year 2010



Year 2040



Available resources

Water needs in all sectors

Deficit

Water demand in Lebanon : IWRM

Two scenarios

~~**Water Stress**~~

Sustainable management - IWRM

850 Mm³

+

565 Mm³

+

~ 400 Mm³

Stockages Dams and hill lakes

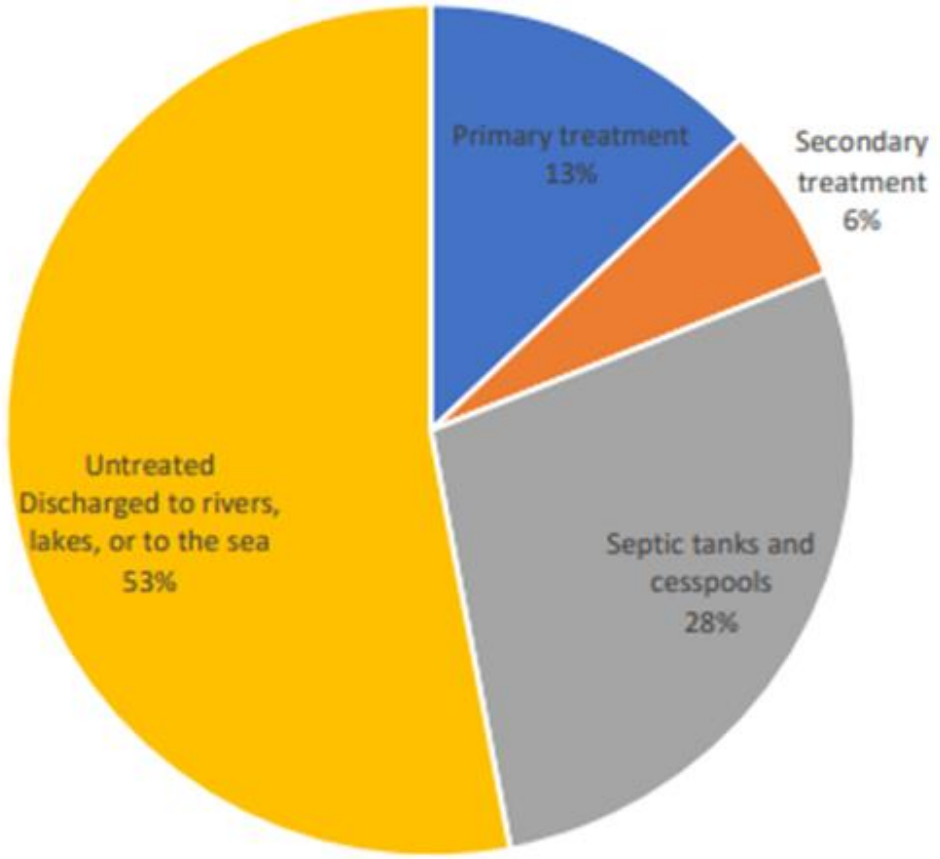
Non Conventional

Network efficiency
Potable water 50% → 80% 2040
Irrigation: - new techniques
Water establishment-
Ministry of Agriculture-

Hydraulic Balance

Wastewater

- Lebanon generates about 248 Mm3 of wastewater per year



Source, MoEW/UNDP/GEF, Lebanon's Fourth Biennial update report the UNFCCC, 2021

Water Resource Quality

- The quality of water resources in Lebanon varies across different locations and throughout the year, it is mainly affected by
  - Haphazard dumping of solid waste
  - Discharge of un-treated or partially treated wastewater into water bodies
  - Leaking wastewater connections and storage systems
  - Excessive use of fertilizers and pesticides
  - Open discharge of waste liquids in the environment
  - Sea water intrusion as a result of over exploitation of groundwater.

Laws and Policies and in Lebanon progress and achievements

The main legislations governing the water sector are:

- Law 144/1925: the public property law (the protection of public water and its use)
- Decision 320/1926 protection of public water and its use
- Law 221, 241 including the amendment Law 337/2001 as well as a number of by-laws, so as to reflect the new vision on water resources management following the requirements of an integrated approach;
- the **Water Code** (law 192/2020)recently ratified that promotes IWRM at river basin level; consolidating the laws governing the ownership, appropriation, utilization, exploitation, development, conservation and protection of water resources.

The Strategies

- **10-year Strategy Plan for the Water Sector** by GDHER / MEW covering the period 2000-2009 (then reviewed and renewed till 2018) that called for a holistic consideration of water resources within a complete policy and planning cycle;
- **National Water Sector Strategy** (NWSS, 2012) that aligns with IWRM principles and mentions the need for preparing and implementing IWRM plans.
- National Water Sector Strategy 2020 undergoing

IWRM

2020 National Water Sector Strategy (NWSS) Axes and Components

- The strategy (draft May 2020) was based on an assessment of existing needs and challenges and proposed methods to address them through 3 axes:
    - Governance
    - Climate Change
    - Infrastructure

- The strategy comprises 7 strategic components to achieve sustainable and integrated management:
    1. Legal and Institutional Reforms,
    2. Reporting and Monitoring,
    3. Operation and Maintenance,
    4. Services Coverage,
    5. Facing Climate Change,
    6. Financial and Commercial Reforms, and
    7. Capacity Building.

Constraints still facing the progress of the water sector in brief

Country "blessed" with abundant water resources , but…:

- 90% of rainfall occurs within a period of 3 months
- Lebanon's soil geological nature (Karstic)
- Groundwater is still the major source used for water supply (overpumping, seawater intrusion, water table level drop…)
- low number of wastewater treatment plants implemented
- Absence of surface water storage facilities
- Inadequacy in the development of management and planning practices due to the disorganized water governance
- Objectives of the 10-year IWRM strategic plan and NWSS were not met yet
- Political and financial constraints
- Etc…

Impact of the Current Economical Crisis on the Water Sector

- The water & wastewater sector is currently facing various challenges at multiple levels and a serious budget deficit
- Increased cost of operation and maintenance of water and wastewater facilities and infrastructure due to devaluation of the Lebanese Lira and huge cost of Fuel
- Disruption of plans and projects in the sector due to the lack of funds
- Increased shortage in staff
- Poor performance of facilities related to power shortages
- Reduced accessibility of population to safe water sources
- In July 2021, UNICEF reported that water supply system in Lebanon is on the verge of total collapse, due to shortages in funding, fuel and other supplies such as chlorine and spare parts

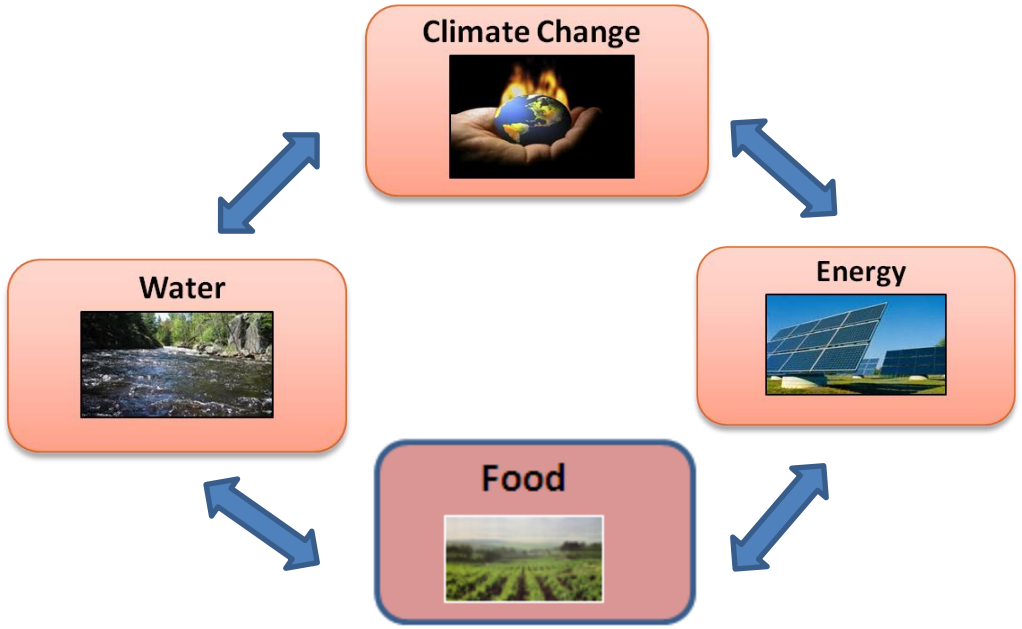
Challenges, Risks and Threats Affecting the Water Sector

- Haphazard Urbanization
- Climate Change
- Pollution of water resources
- Lack of human resources at national authorities
- Overlapping of responsibilities among stakeholders
- High operational cost of facilities especially within the current crisis (fuel, Lira devaluation)
- Poor and aging infrastructure
- Lack of accurate and reliable data related to water availability and quality

The climate change issue

Climate change will affect availability and use of both water, energy and food

It acts as an amplifier of the already-intense competition over the three



- Impacts of CG on both regional and global hydrological systems will increase, bringing higher levels of risk, with some regions more impacted than others.
- Each situation will require the appropriate and sustainable use of water and energy resources locally.
- Impact on food prices, increase on demand by around 40% between 2010 and 2030 by the growing population.

Interlinkages of Water Sector with Energy, Food and Ecosystems

Water and Energy

- Water supply and wastewater treatment facilities are highly dependent on reliable energy supply to function properly
- Water is used to produce energy in Lebanon through the Hydroelectric power stations such as the plants operated by the LRA along the Litani rivers.
- The shortage in energy supply has led to the disruption of the operations at water and wastewater facilities, and the high cost of fuels are substantially increasing operating costs of these facilities .
- Water Establishments is seeking now Alternative Power sources of funding for Projects such as Solarization projects at the level of Pumping and Treatment stations from international Organisations, some implemented, some under implementation and other will be (USAID, UNDP, UNHCR, UNOCHA, etc)

Water and Agriculture

- Agricultural production is highly dependent on water supply, in terms of availability and quality
- Agriculture consumes 70% of freshwater resources in Lebanon, about 50% of which is pumped from wells
- Agriculture is a major contributor to the pollution of water resources due to unsustainable practices, including over-use of pesticides and fertilizers

Water and Ecosystems

- Healthy ecosystems are a critical part of the water cycle; they mitigate the effects of floods and droughts and contribute to the treatment of wastewater through the purification processes of aquatic and terrestrial ecosystems
- Such properties have led to the use of certain plants in wastewater treatment, as in the case of the Bchare and Remhala Reed Bed WWTP.
- The pollution of water resources and altering of natural water courses can lead to the deterioration of habitats and the death of species

Needs and Opportunities in Water Resource Management

Way Forward:

- Applying IWRM at the basin level with a comprehensive hydrologic and water resources management system and related master plans is a good to start, taking into account climate variability
- Action Plans are prepared on a yearly basis, without forgetting that the setting-up and making operational of a decision support system (DSS) at the River Basin scale with Multi-stakeholder body established leading to the elaboration of a consensual national IWRM action plan with good investment.
- Water policies and strategies must be updated constantly with integrating climate change and drought management, the Food, water, Energy and Ecosystem Nexus approach aligned with UFM Mediterranean Strategy and AGENDA with mainstreaming of Gender dimension, Especially When it comes to investments and trade-offs, Energy and Agriculture are traditionally stronger players than Water and Environment within a national development process.

Way Forward:

- Implementation of water supply - demand management strategies especially including Non-conventional water resources to reduce water consumption in the domestic, industrial and agriculture sectors which is consuming most of the water supply, equitable access to sustainable water supply(reducing losses in networks, modern methods for irrigation, water savings, etc)
- Increasing public awareness and education on water and climate change is a must.
- Enhancing Governance, dialogue , partnerships and investments are key ingredients for witnessing progress.
- Enabling the Environment for Public-Private partnership investments in the water sector
- Implementation of National Water Information System is very important

Water Sector Needs

- Administrative: need to restructure the organizational charts and departments at MoEW and RWE to update their functions and enhance management efficiencies
- Technical: improve monitoring of quantities and quality of freshwater sources, promote and regulated groundwater recharge, etc.
- Financial: enhance fee collection and adjust rates, procure needed funds to implement, operate and maintain facilities, etc.
- Human resources: hire skilled and qualified personnel for various positions, develop capacities and train staff on relevant issues related to their responsibilities

Opportunities to Improve the Situation of the Sector

- Collaborate with MoA and other stakeholders to promote water-saving agricultural production.
- Collaboration with the donors to implement projects aligns with Water-Energy-Food-Ecosystems Nexus approach offers in terms of prioritizing interventions that can produce co-benefits for those different sectors
- Promote rainwater harvesting technologies (from rooftops, town squares, in ponds, reservoirs and hill-lakes).
- Adopt renewable energy technology at facilities to reduce operational costs
- Enhance cost recovery through adjustment of fees, metering and increasing fee collection rates

Thank you